



Workshop Manual Fox 2004 ➤

Electrical system

Edition 04.2014





List of Workshop Manual Repair Groups

Repair Group

- 27 - Starter, current supply, CCS
- 90 - Gauges, instruments
- 92 - Windscreen wash/wipe system
- 94 - Lights, bulbs, switches - exterior
- 96 - Lights, bulbs, switches - interior
- 97 - Wiring

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.



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27 – Starter, current supply, CCS

1 Battery

(VRL006656; Edition 04.2014)



WARNING

Risk of injuries! Observe safety warnings and instructions ⇒ General information; Rep. gr. 27; Starter, alternator, battery.



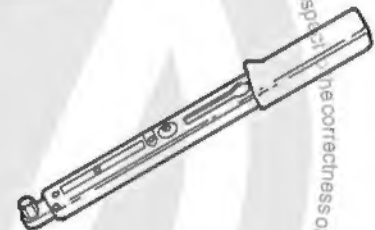
Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-

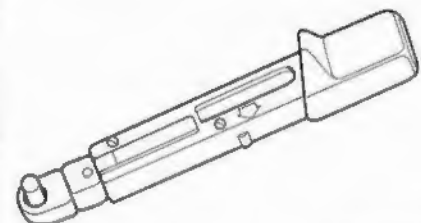
V.A.G 1331



Q00-10065

- ◆ Torque wrench - 40 to 20 Nm (enc. 3/8") - VAG 1410-

V.A.G 1410



Q00-10086



1.1 Battery - A- - disconnect and connect



Note

The Battery - A- earth wire fastening should not be removed from the vehicle body.

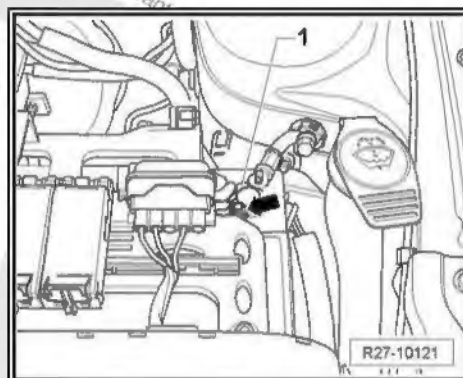
1.1.1 Disconnect



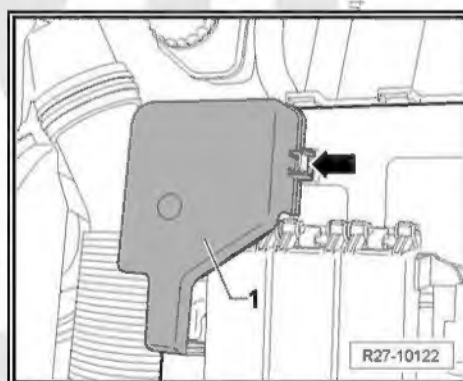
WARNING

To avoid accident risks, please always disconnect first the terminal connected to the negative battery pole.

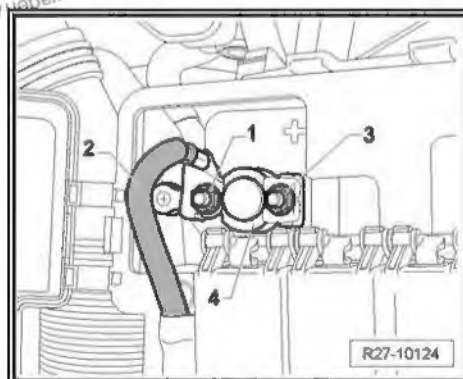
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Loosen fastening nut -arrow- (6 Nm) and remove earth strap terminal -1- from the negative pole on Battery - A- .



- Press the lock -arrow- and tilt the positive battery pole cover -1- on Battery - A- .



- Loosen fastening nut -1- (6 Nm) and remove terminal of positive cable -2- in the fuse box.
- Loosen fastening nut -3- (6 Nm) and remove terminal of positive cable -4- on Battery - A- .





1.1.2 Connect



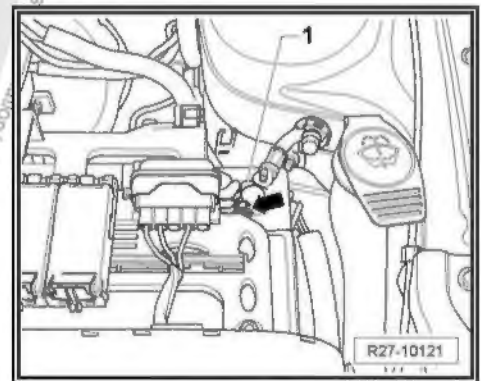
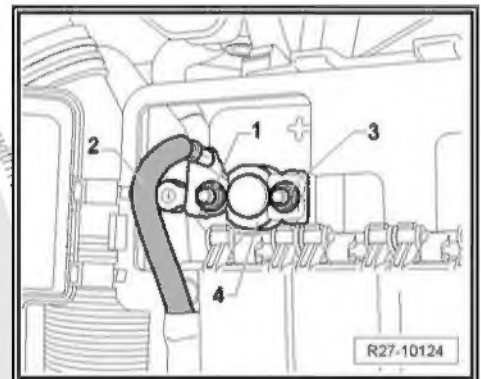
Caution

Please observe the notes on the battery terminal fastening screw ➔ General information; Rep. gr. 27; Starter, alternator, battery.



Note

- ◆ *The Battery - A- terminals should not be lubricated.*
 - ◆ *Connect the Battery - A- pole terminals manually without forcing them in order to prevent damages to the Battery - A- case.*
 - ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*
 - ◆ *Before carrying out measurements, check the external conditions and the connections of the Battery - A-.*
- Insert the terminal of positive cable -4- in the positive pole on Battery - A-, mount the positive cable -2- and tighten the fastening nuts -1 and 3- to the specified tightening torque ➔ [page 8](#).
- Insert the earth strap terminal -1- into the negative pole of the Battery - A- and tighten the fastening nut -arrow- to the specified tightening torque ➔ [page 8](#).





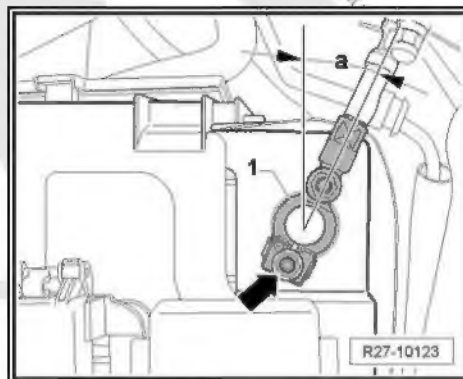
Note

Only for vehicles with "BPA and CCRA" engines you are required to place terminal -1- so that the measure -a- is 25° and tighten the fastening nut -arrow- to the specified tightening torque
⇒ [page 8](#).



WARNING

If the terminals are not firmly fastened to the battery poles, first you must disconnect the terminal connected to the negative battery pole to avoid the risk of an accident.



1.2 Battery - A- - remove and install



Note

To remove the Battery - A-, it is not necessary to remove the fuse box, just move it to the right, respecting the cable clearance.

1.2.1 Removal

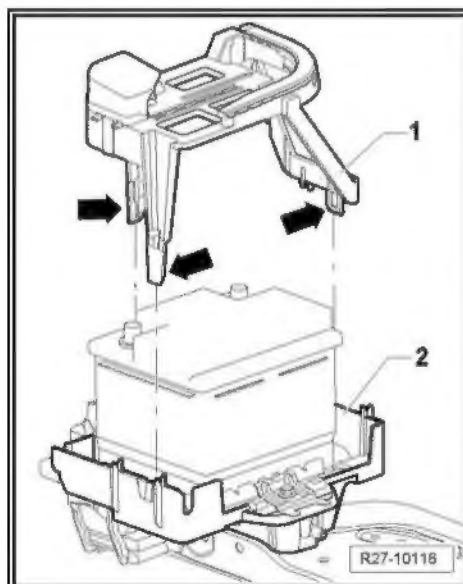
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Remove and move away the fuse box until releasing space to remove its support ⇒ [page 174](#).

Continuation for:

Fuse box support (version 1):

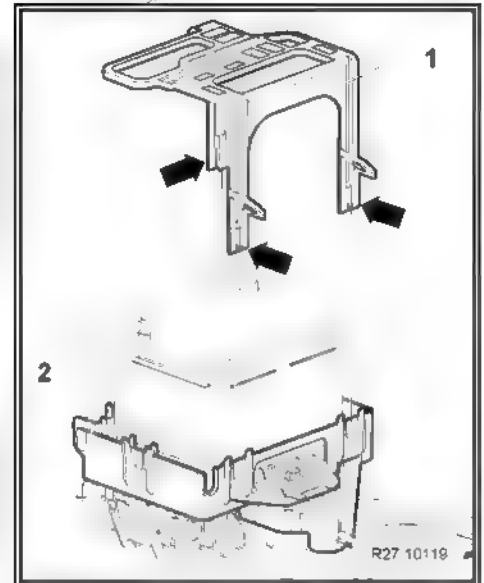
- Release locks -arrows- and remove fuse carrier -1- from Battery - A- console-2-.

Fuse box support (version 2):



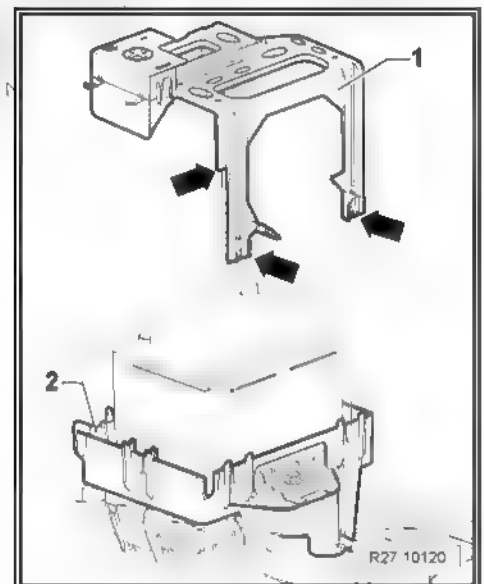
- Release locks -arrows- and remove fuse carrier -1- from Battery - A- console-2-

Fuse box support (version 3):

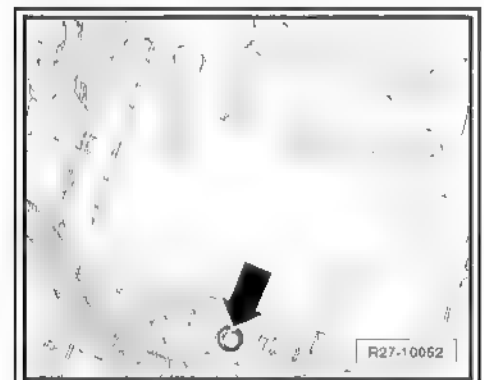


- Release locks -arrows- and remove fuse carrier -1- from Battery - A- console-2-

Continuation:



- Loosen and remove the fastening screw -arrow- (20 Nm) and the fastening support of the Battery - A- .
- Remove the Battery - A- from its housing.

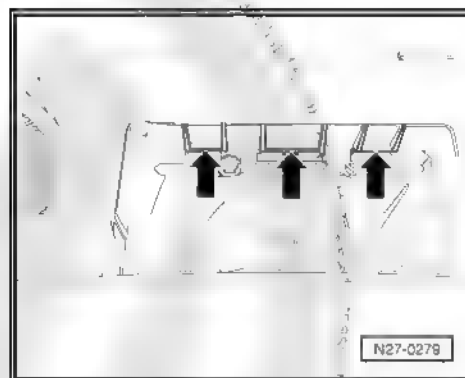


1.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following.



- Install the Battery - A- so that the Battery - A- base frame fits below the support projections -arrows- of the Battery - A- .

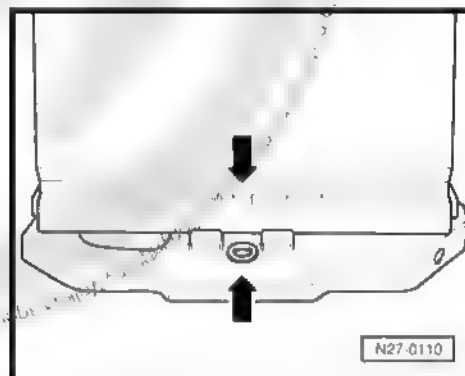


The Battery - A- will be correctly positioned when the central groove of its base is aligned with the hole on the Battery - A- -arrows-.

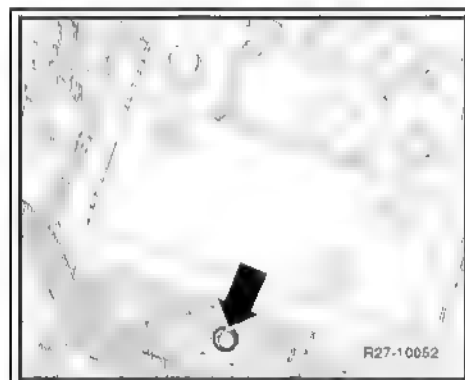


Note

- ◆ For Batteries - A- with flexible tube for central degassing, please make sure that the flexible tube is not disconnected. This is the only way the Battery - A- can be freely degassed.
- ◆ With Batteries - A- without flexible tube for central degassing, please make sure the opening on the upper cover section is not clogged.



- Install the support and fastening screw -arrow- of the Battery - A- .
- Tighten the fastening screw -arrow- to the specified tightening torque ⇒ [page 8](#) .
- Install support and fuse box.
- Connect the Battery - A- ⇒ [page 1](#) .
- After installation, check the correct Battery - A- fastening. If the Battery - A- is not firmly fastened, the following may happen:
 - The Battery - A- service life may be reduced due to vibration.
 - There may be damage to the Battery's - A- case.
 - Safety issues in case of collision.



1.3 Battery - A- console - remove and install

1.3.1 Battery - A- console for vehicles with (ASY, BPA, CCRA) engines - remove and install

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect and remove Battery - A- ⇒ [page 1](#) .
- Remove the air filter assembly ⇒ Engine; Rep. gr. 24 ; Air filter assembly - remove and install .

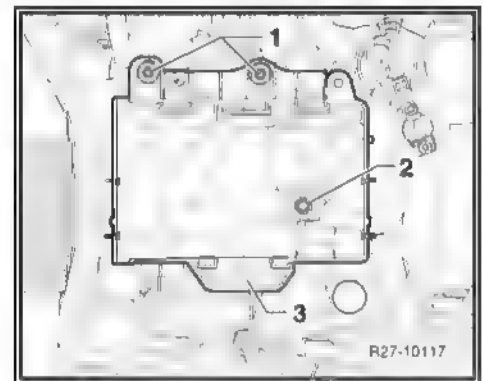
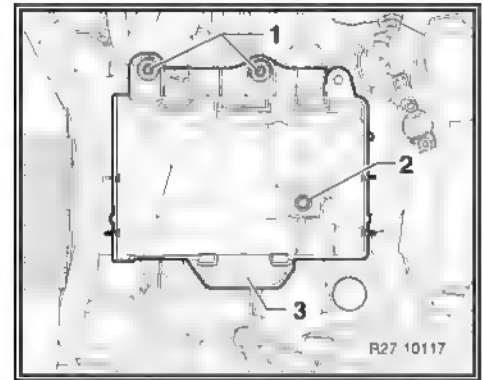


- Loosen the securing nuts -1- (16 Nm) and fastening screw -2- (16 Nm) from the Battery - A- console-3-.
- Remove the flexible rubber draining tube from the lower part of the Battery - A- console
- Remove the Battery - A- console-3- from its housing.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the securing nuts -1- and the fastening screw -2- to the specified torque ⇒ [page 8](#) .
- After installing, check correct seating of the Battery - A- on its console.
- Connect the Battery - A- ⇒ [page 1](#) .



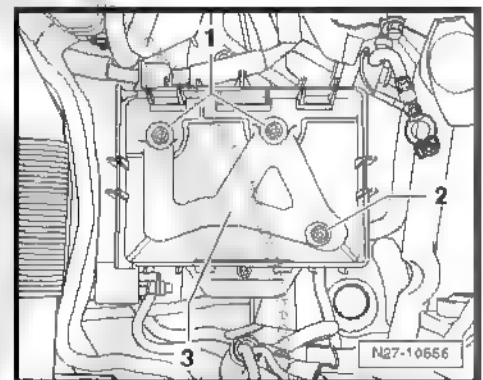
1.3.2 Battery - A- console for vehicles with (AQZ, BJE, BLH, BAH, BJA, BNX, CCNA) engines - remove and install

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect and remove Battery - A- ⇒ [page 1](#) .
- Loosen the securing nuts -1- (16 Nm) and fastening screw -2- (16 Nm) from the Battery - A- console-3-.
- Remove the flexible rubber draining tube from the lower part of the Battery - A- console.
- Remove the Battery - A- console-3- from its housing.

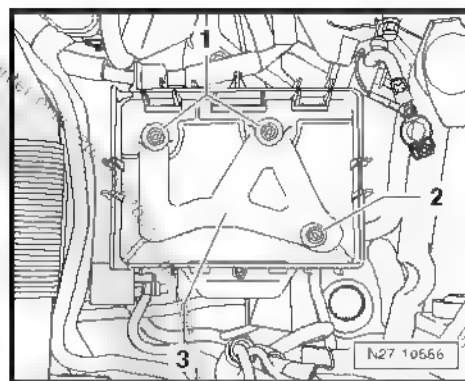
Installation:

Installation is performed in reverse sequence to the removal, considering the following:





- Tighten the securing nuts -1- and the fastening screw -2- to the specified torque ➤ [page 8](#) .
- After installing, check correct seating of the Battery - A- on its console
- Connect the Battery - A- ➤ [page 1](#) .



1.4 Tightening torques - battery

Location	Tightening torques
Terminals in battery poles	6 ± 1 Nm
Auxiliary terminal to battery pole terminal	6 ± 1 Nm
Fastening bolt of the battery support	$20 + 6$ Nm
securing nut for battery console	16 ± 2 Nm
Fastening screw for battery console	16 ± 2 Nm



2 Starting motor



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



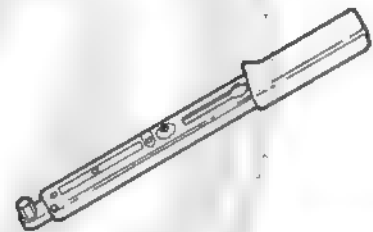
Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-

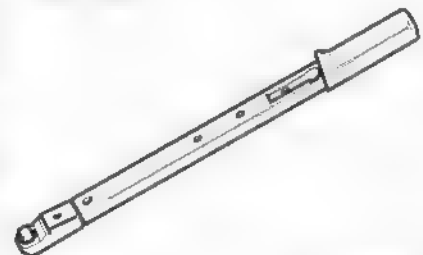
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- ◆ Torque wrench 40 - 200 Nm - VAG 1332-

V.A.G 1332



Q00-10074

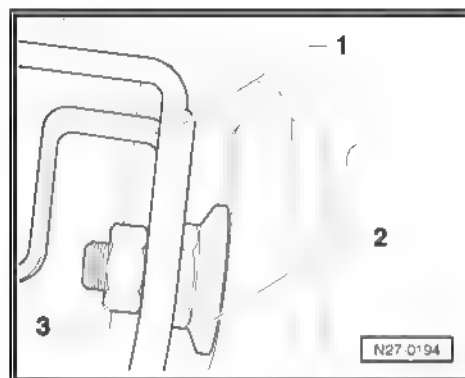
2.1 Starter - B- - remove and install

2.1.1 Removal

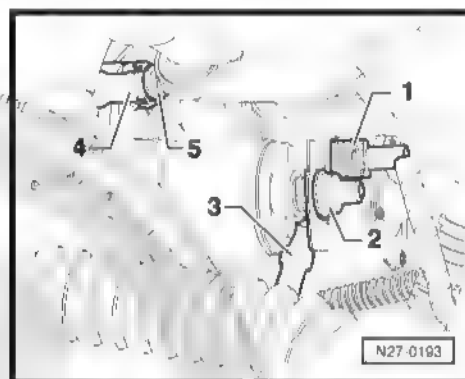
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Put the vehicle on a lift in order to make the operation easier



- Disconnect the Battery - A- ➔ [page 1](#) .
- Put the vehicle on a lift in order to make the operation easier
- Remove the lower engine noise insulation, if necessary ➔ General body repairs, exterior; Rep. gr. 50 , Body - Front section .
- Remove gearbox selector lever ➔ Clutch and transmission; Rep. gr. 34 ; Drive, case .
- Remove securing nut-3- (15 Nm) below the Starter - B- and remove cable support -1-.
- Remove the fastening screw -2- (80 Nm) for the Starter - B- .



- Disconnect terminal 50 -1- from Starter - B- .
- Remove the plastic cover -2- and remove the positive wire -3- from the magnetic switch.
- Remove hexagonal nut -5- (15 Nm).
- Remove earth wire -4- and loosen the hex head screw (80 Nm).
- Remove the Starter - B- .



2.1.2 Installation

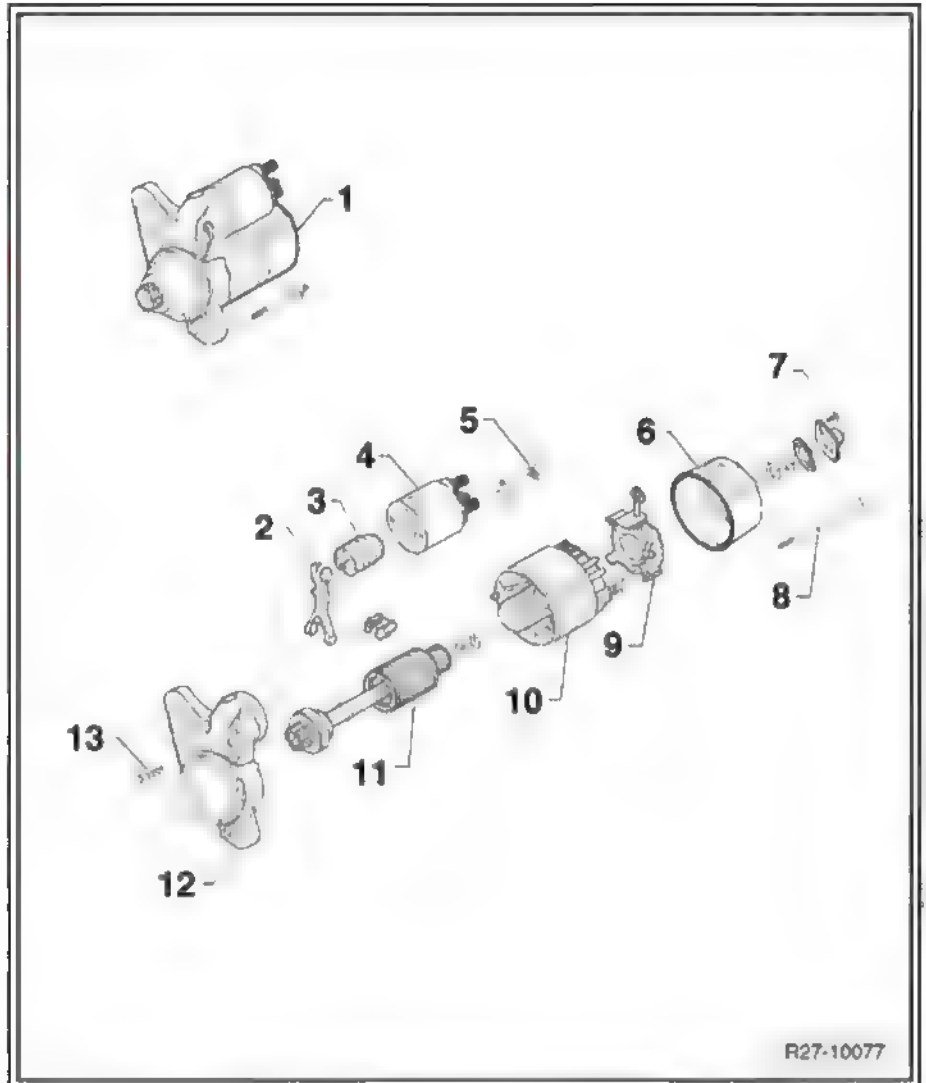
Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the Starter - B- fastening nuts to the specified tightening torque ➔ [page 27](#) .

2.2 Starter - B- - (Manufacturer Valeo) - disassemble and assemble



- 1 - Starting motor - B-
 - ☐ Remove and install
⇒ [page 9](#)
- 2 - Lever
- 3 - Mobile core
- 4 - Magnetic switch
 - ☐ Remove and install
⇒ [page 11](#) .
- 5 - Hexagonal nut
 - ☐ 9.5 Nm.
- 6 - Starter - B- cover
- 7 - Screw
 - ☐ 3.3 Nm.
- 8 - Screw
 - ☐ 6.4 Nm.
- 9 - Brush holder
- 10 - Coil (Polar case)
- 11 - Gearing pinion and armature assembly
 - ☐ Remove and install
⇒ [page 12](#) .
- 12 - Drive bearing
- 13 - Screw
 - ☐ Used to fasten the magnetic wrench.
 - ☐ 3.75 Nm.

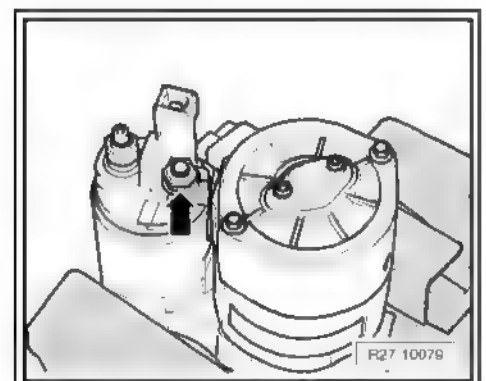


R27-10077

2.2.1 Magnetic switch - remove and install

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the Starter - B- ⇒ [page 9](#) .
- Loosen the securing nut -arrow- (9.5 Nm) and disconnect the brush cable.



R27 10079



- Remove the fastening screws -arrows- (3.75 Nm) from the magnetic switch.



Note

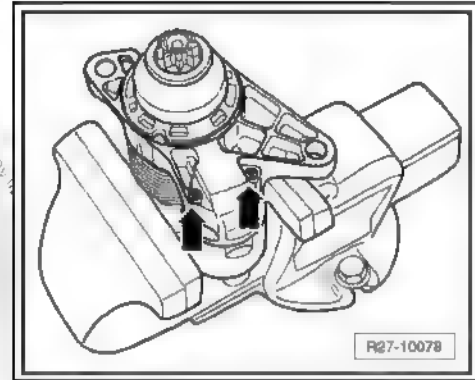
Use a good quality wrench. If removal is difficult, hit the screw heads sharply a few times with a pointed punch.

- Remove the magnetic switch.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

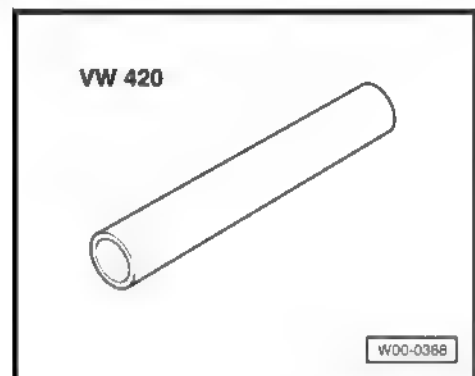
- Install the spring and magnetic switch, and fasten the magnetic switch screws to (3.75 Nm).
- Connect the brush cable by fastening it with the nut tightened to (9.5 Nm).
- Install the Starter - B- ⇒ [page 9](#).



2.2.2 Armature and gearing pinion - remove and install

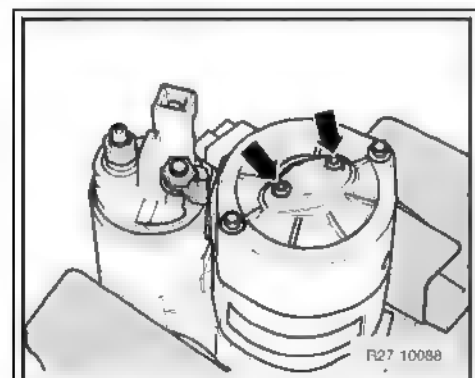
Special tools and workshop equipment required

- ◆ Pressure tube, VW 420-



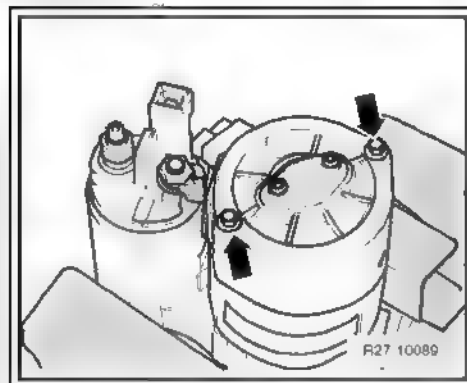
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Remove the Starter - B- ⇒ [page 9](#).
- Remove the magnetic switch ⇒ [page 11](#).
- Loosen the fastening screws -arrows- (3.3 Nm) from the rear cover of the shaft end.
- Remove lock washer, flat washer, and sealing ring.





- Remove fastening screws for the polar case cover cap -arrows- (6 4 Nm) and remove the cover.



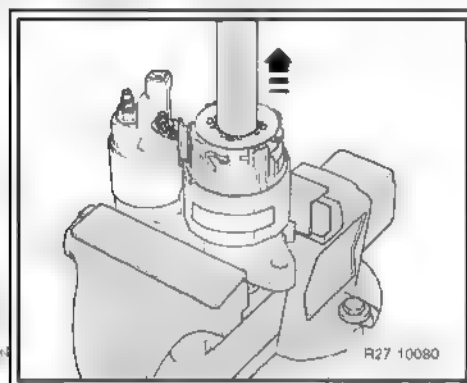
- Using the Pressure tube - VW 420- as a guide, slide the brush holder -arrow- and remove it from the armature.



Note

Handle carefully, because the springs may jump out of the brush holder.

- Remove the polar case by pulling it out.



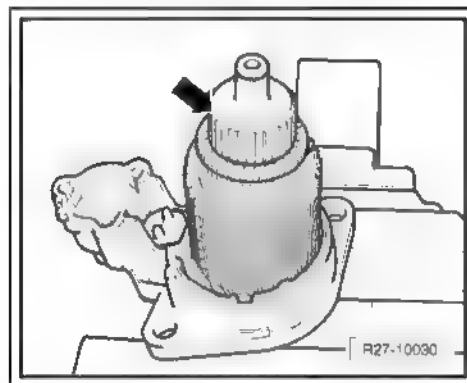
Note

Please be very careful with your fingers, as the armature is strongly pulled by the magnets.

- Remove the armature and gearing pinion.

Installation:

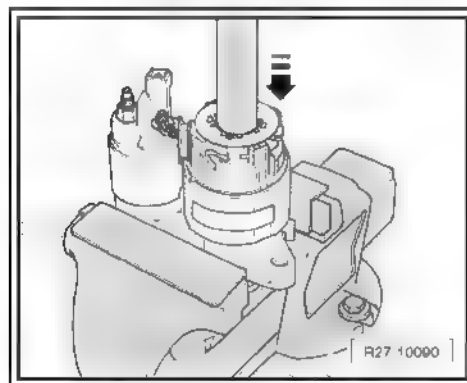
- Fit the armature -arrow- to the activation bearing, together with the operating rod and rubber stop.
- Fit the polar case.



Note

Please be very careful with your fingers, as the armature is strongly pulled by the magnets.

- Fit the brush holder using the Pressure tube - VW 420- and slide it toward the rotor -arrow-, then remove the tool.





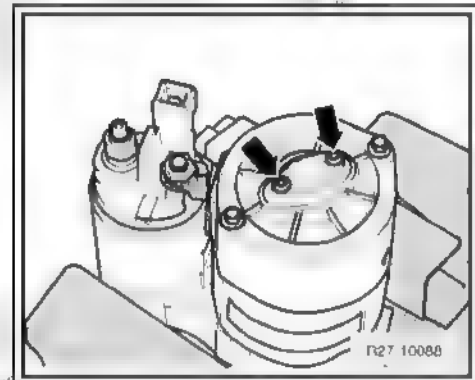
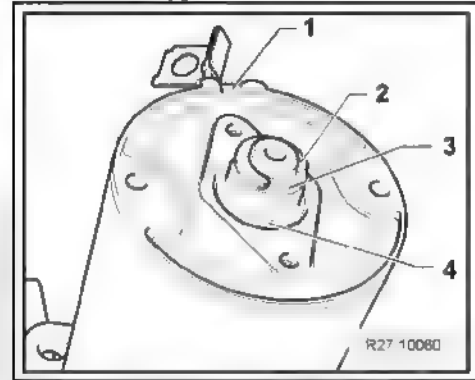
- Install rear cover, paying attention to the correct position of tab and the cover screw holes.
- Place cable seal rubber on the case cover -1-.
- Fit seal -4-, plain washer -3- and circlip -2- on armature shaft.



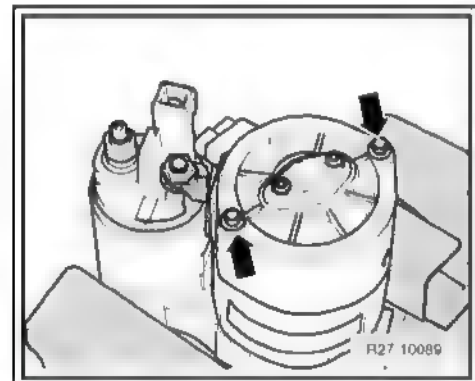
Note

If you are unable to easily fit the circlip, pull the shaft a little outwards.

- Install the rear axle end cover and tighten the screws -arrows- to a (3.3-Nm) torque.



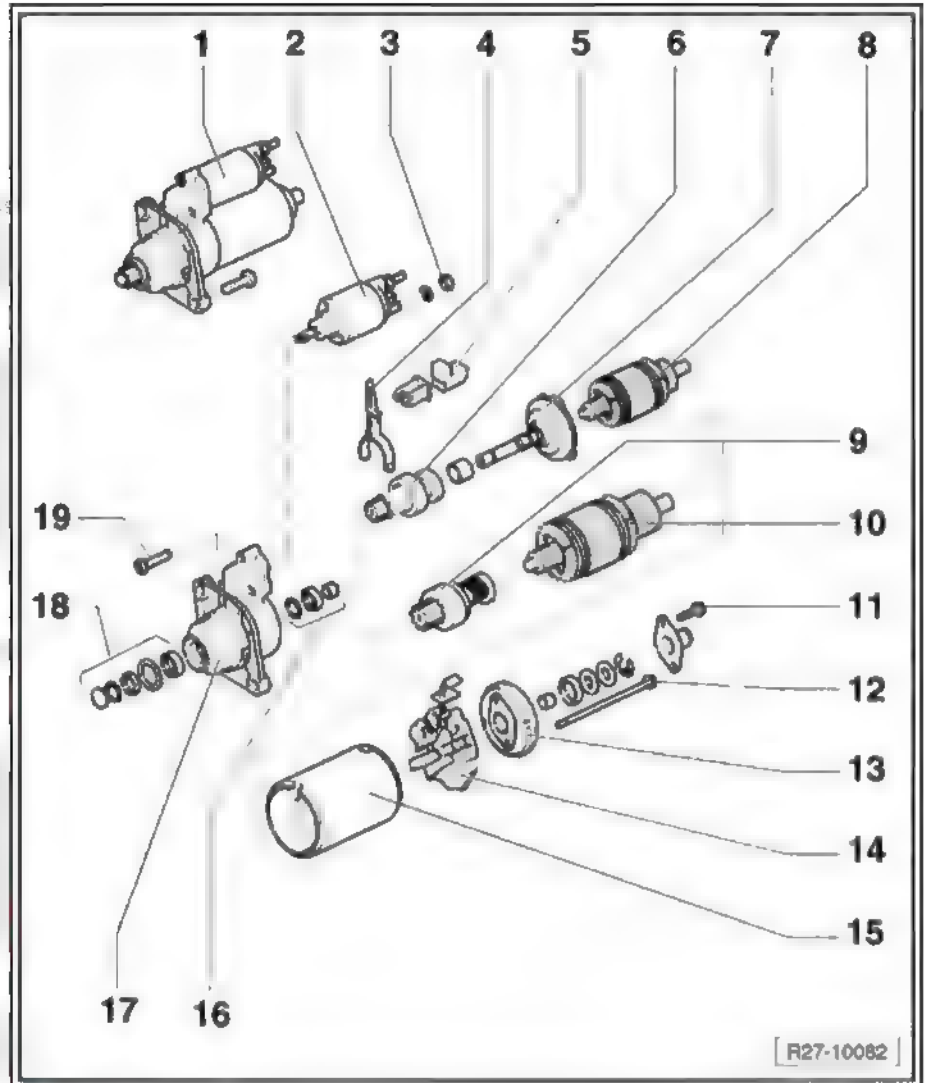
- Install the fastening screws -arrows- of the polar case cover cap by applying a (6.4-Nm) torque.
- Install the magnetic switch ⇒ [page 11](#) .
- Install the Starter - B- ⇒ [page 9](#) .



2.3 Starter - B- - (Manufacturer Bosch) - disassemble and assemble



- 1 - Starting motor - B-
 - ☐ Remove and Install
→ [page 9](#)
- 2 - Magnetic switch
 - ☐ Remove and install
→ [page 15](#) .
- 3 - Hexagonal nut
 - ☐ 8 Nm.
- 4 - Operating rod
- 5 - Rubber stopper
- 6 - Gearing pinion
 - ☐ Remove and install
(Fastened on planetary gear shaft)
→ [page 22](#) .
- 7 - Planetary gear
- 8 - Armature
 - ☐ Remove and install
→ [page 16](#) .
- 9 - Gearing pinion
 - ☐ Remove and install
(Fastened on armature shaft) → [page 19](#) .
- 10 - Armature
 - ☐ Remove and install
→ [page 16](#) .
- 11 - Screw
 - ☐ 2 Nm.
- 12 - Screw
 - ☐ 6 Nm.
- 13 - Starter - B- cover
- 14 - Brush holder
- 15 - Coil (Polar case)
- 16 - Circlip and capsule
- 17 - Drive bearing
- 18 - Repair set (metal cover, bearing bushing, sealing ring)
- 19 - Screw
 - ☐ Used to fasten the magnetic wrench.
 - ☐ 7 Nm.



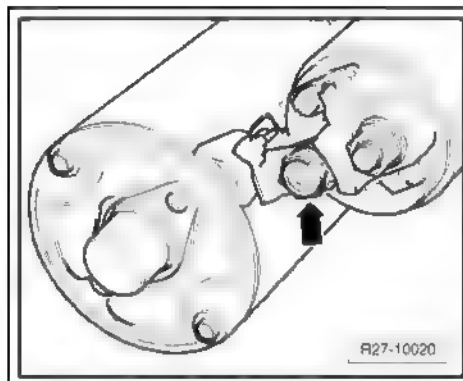
2.3.1 Magnetic switch - remove and install

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#) .
- Remove the Starter - B- → [page 9](#) .



- Remove the securing nut -arrow- (8 Nm) and disconnect the brush cable.



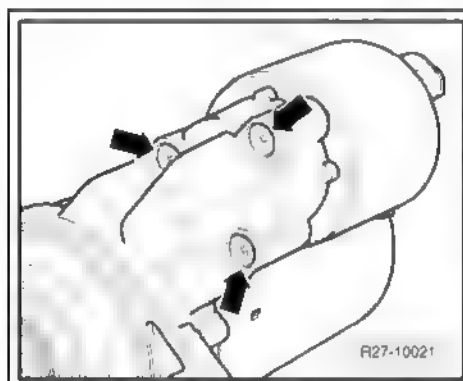
- Remove the fastening screws -arrows- (7 Nm) from the magnetic switch.



Note

Please use a good quality cross-slotted screwdriver. If removal is difficult, hit the screw heads sharply a few times with a pointed punch.

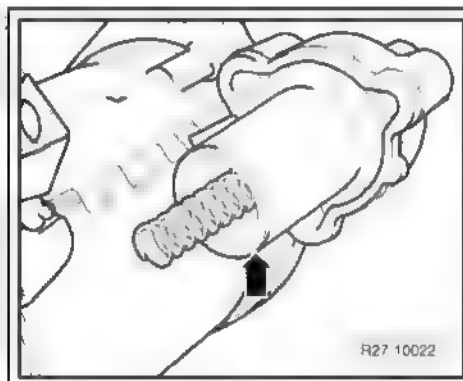
- Remove the magnetic switch.



- Remove the spring and the rod operating plunger -arrow-.

Installation:

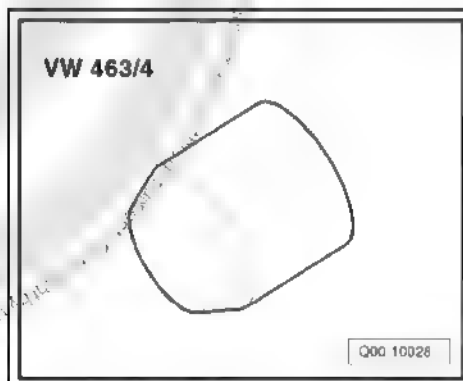
- Install plunger onto operating rod.
- Install spring and magnetic key, fastening the screws with torque (7 Nm).
- Connect the brush cable, fastening the nut to a 8-Nm torque.
- Install the Starter - B- ➔ [page 9](#) .



2.3.2 Armature - remove and install

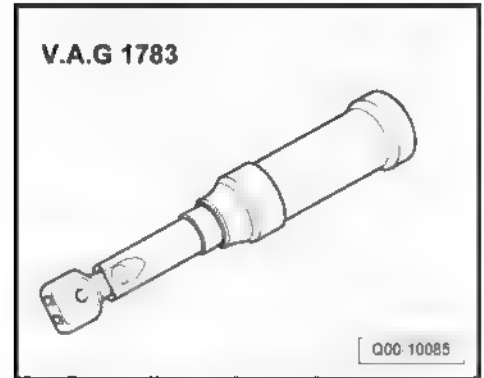
Special tools and workshop equipment required

- ♦ Device - VW 463/4 - .



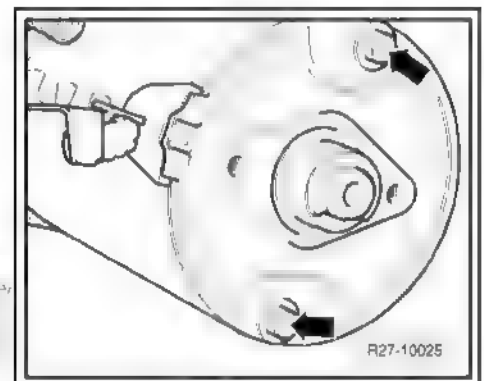


- ◆ Torque wrench 2 to 10 Nm - VAG 1783- .



Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the Starter - B- ➔ [page 9](#) .
- Remove the magnetic switch ➔ [page 11](#) .
- Remove shaft end rear cover, circlip, plain washer, and sealing ring.
- Remove the fastening screws -arrows- (6 Nm) from the polar case cover cap.

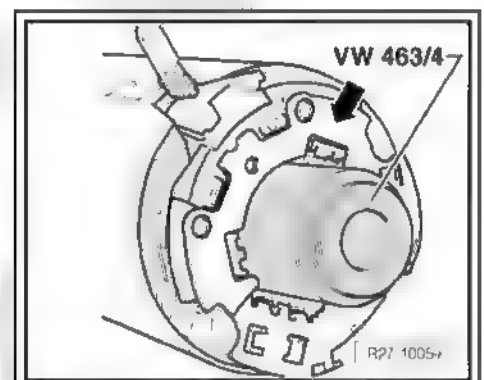


- Using the Device - VW 463/4- as a guide, slide the brush holder -arrow- and remove it from the armature.
- Remove the armature from the polar case by pulling it.



Note

Please be very careful with your fingers, as the armature is strongly pulled by the magnets.

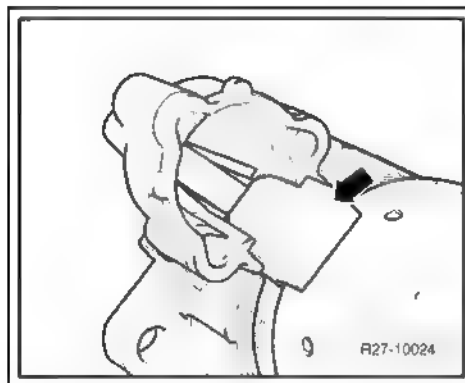




- Remove the rubber buffer -arrow-

Installation:

- Install the armature in the activation bearing and in the polar case

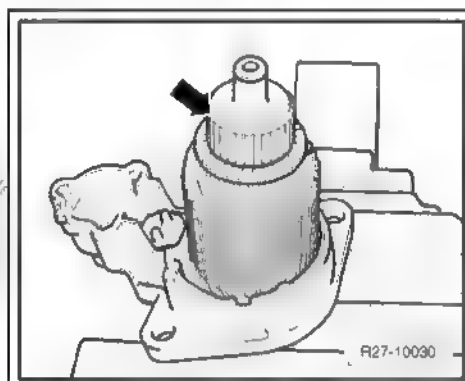


- Fit the armature -arrow- to the activation bearing, together with the operating rod and rubber buffer.

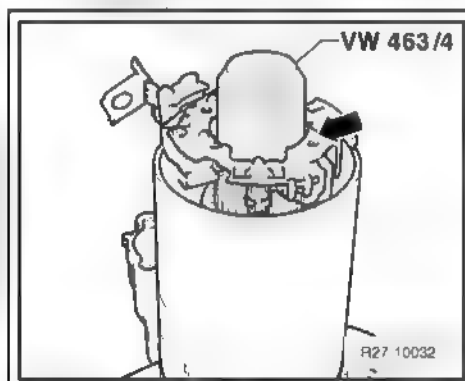


Note

Please be very careful with your fingers, as the armature is strongly pulled by the magnets.



- Fit the brush holder -arrow- using the Device - VW 463/4-, sliding it toward the rotor, and then removing the tool.

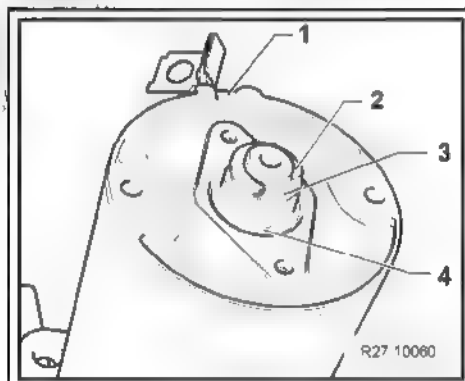


- Place the housing cable seal rubber -1-.
- Install rear cover, paying attention to the correct position of tab and the cover screw holes.
- Fit seal -4-, plain washer -3- and circlip -2- on armature shaft.



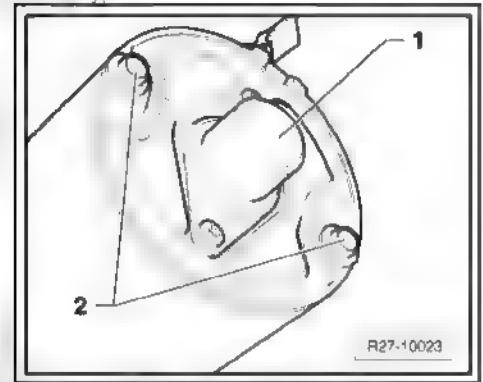
Note

If you are unable to easily fit the circlip, pull the shaft a little outwards.





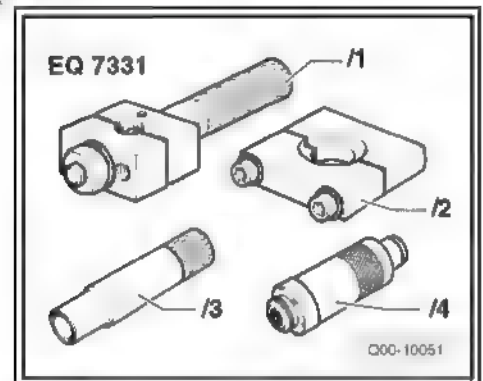
- Install rear axle end cover -1- and tighten the screws with a (2-Nm) torque.
- Install and tighten fastening screws -2- of the polar case cover cap by applying a (6-Nm) torque.
- Install the magnetic switch → [page 15](#) .
- Install the Starter - B- → [page 9](#) .



2.3.3 Gearing pinion (Fastened on armature shaft) - remove and install

Special tools and workshop equipment required

- ◆ Assembly device - EQ-7331/1-
- ◆ Assembly tool - EQ-7331/2-
- ◆ Lock puller - EQ-7331/3-
- ◆ Pressing tool - EQ-7331/4-



Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#) .
- Remove the Starter - B- → [page 9](#) .
- Remove the armature → [page 16](#) .

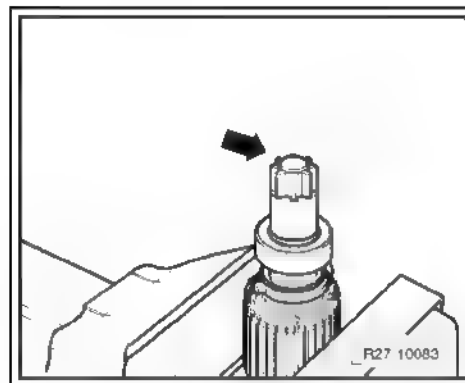


WARNING

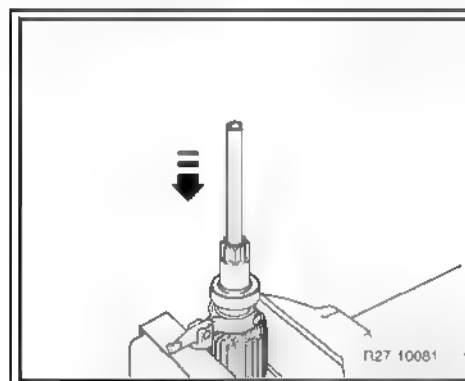
When setting the armature on the vise, please be careful not to damage the magnets. Should any damage occur, the armature must be replaced.



- Remove metallic cover -arrow- with the Assembly device -EQ-7331/1- .



- Lower the fastening capsule of the circlip by using a tube with diameter (13 mm)-arrow-, tapping slightly on the tube with a rubber or wooden hammer until displacing the capsule from the circlip.
- Use pliers or a screwdriver to remove the circlip and capsule from the armature shaft.



- Remove the gearing pinion -arrow - from the armature shaft.

Installation:



WARNING

Whenever the gearing pinion is being repaired, please replace the components below: metallic cover, circlip and capsule.

- Secure slightly the armature on the vise.



WARNING

When setting the armature on the vise, please be careful not to damage the magnets. Should any damage occur, the armature must be replaced.

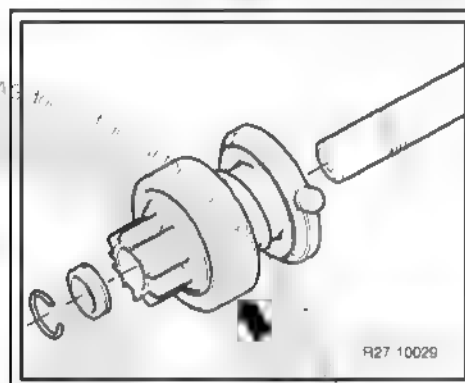
- Install the gearing pinion in the armature shaft.
- Fit the buffer capsule on the armature shaft.



Note

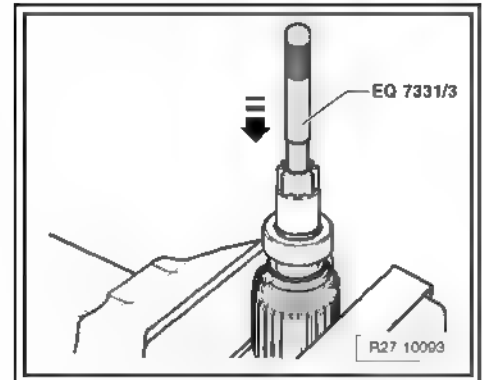
Observe that the buffer capsule has an assembling side

- Mount the circlip on shaft

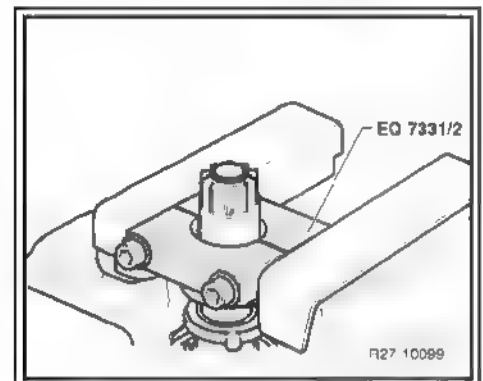




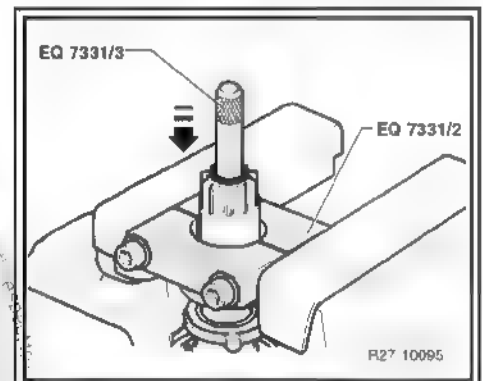
- Fit the circlip on the shaft notch by using the Lock puller - EQ-7331/3- and tapping slightly with a hammer towards -arrow-



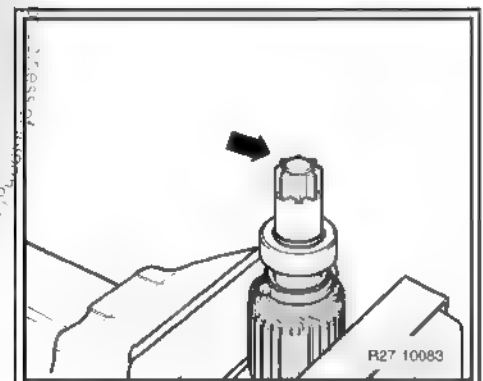
- Mount the Assembly tool - EQ-7331/2- on the gearing pinion and secure the assembly on the vise.



- To encapsulate the circlip to the fastening capsule, use the Lock puller EQ-7331/3- and tap slightly with a hammer towards -arrow- until fitting.

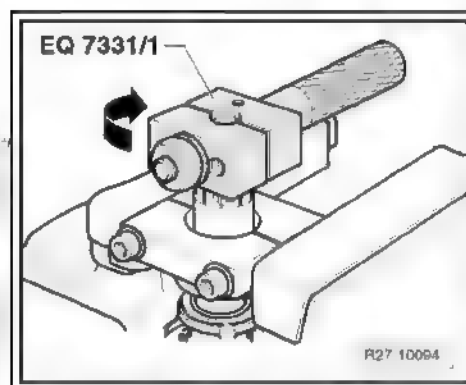


- Install the metallic cover-arrow-





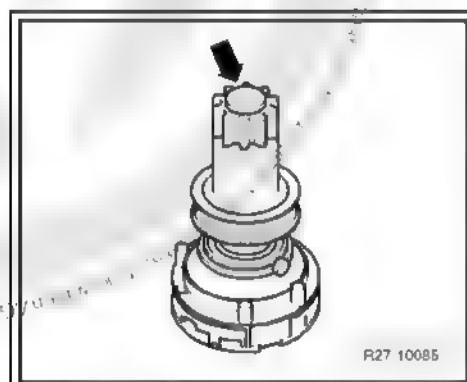
- Use the Assembly device - EQ-7331/1--1- to drive the metallic cover on the gearing pinion.
- Install the armature → [page 16](#) .



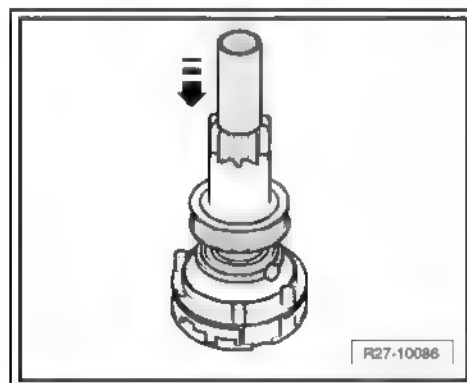
2.3.4 Gearing pinion (Fastened on planetary shaft) - remove and install

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the Starter - B → [page 9](#) .
- Remove the armature → [page 16](#) .
- Remove metallic cover - arrow- with the Assembly device - EQ-7331/1- .



- Lower the fastening capsule of the circlip by using a tube with diameter (13 mm)-arrow-, tapping slightly on the tube with a rubber or wooden hammer until displacing the capsule from the circlip.
- By using pliers or a screwdriver, remove the circlip and capsule from the planetary shaft.





- Remove the gearing pinion -arrow- from the planetary shaft

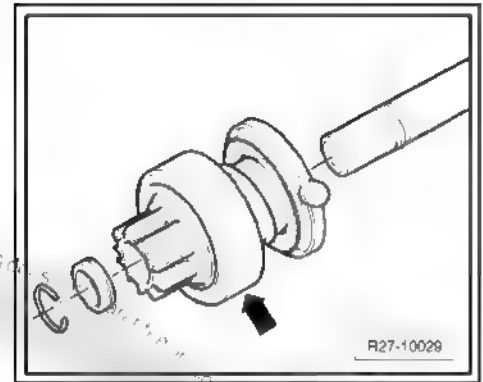
Installation:



WARNING

Whenever the gearing pinion is being repaired, please replace the components below: metallic cover, circlip and capsule.

Check the conditions of the existing bushing on the planetary gear. If the inside diameter is greater than 0.32 in, Bosch recommends the component replacement.



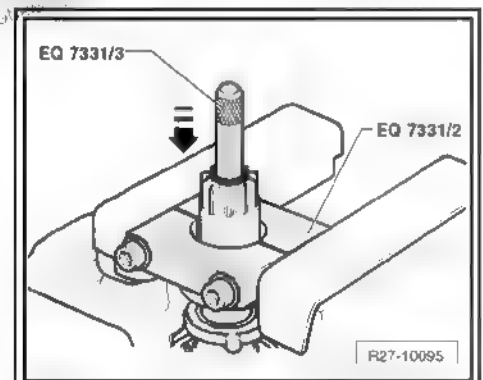
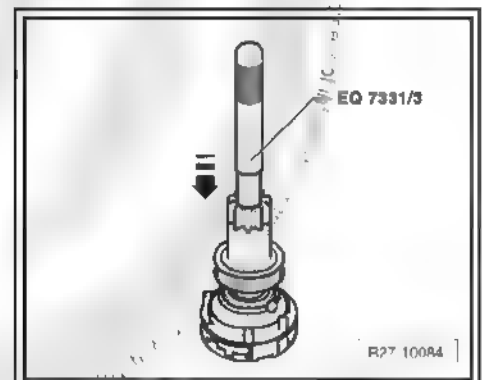
- Install the gearing pinion on the planetary shaft
- Fit the stop capsule on the planetary shaft.



Note

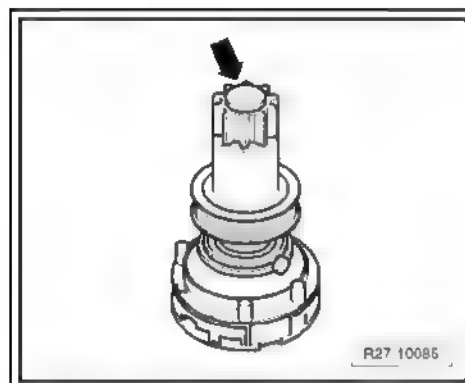
Observe that the buffer capsule has an assembling side.

- Mount the circlip on shaft.
- Fit circlip on the shaft notch by using the Lock puller - EQ-7331/3- -3- and tapping slightly with a hammer towards -arrow-.
- To encapsulate the circlip to the fastening capsule, use the Lock puller - EQ-7331/3- -3- and tap slightly with a hammer towards -arrow- until fitting.

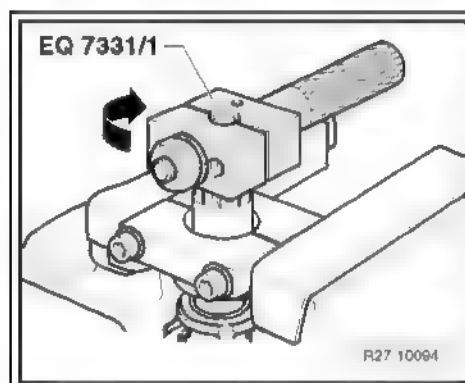




- Install the metallic cover-arrow-.



- Use the Assembly device - EQ-7331/1--1- to drive the metallic cover on the gearing pinion.
- Install the armature ⇒ [page 16](#) .



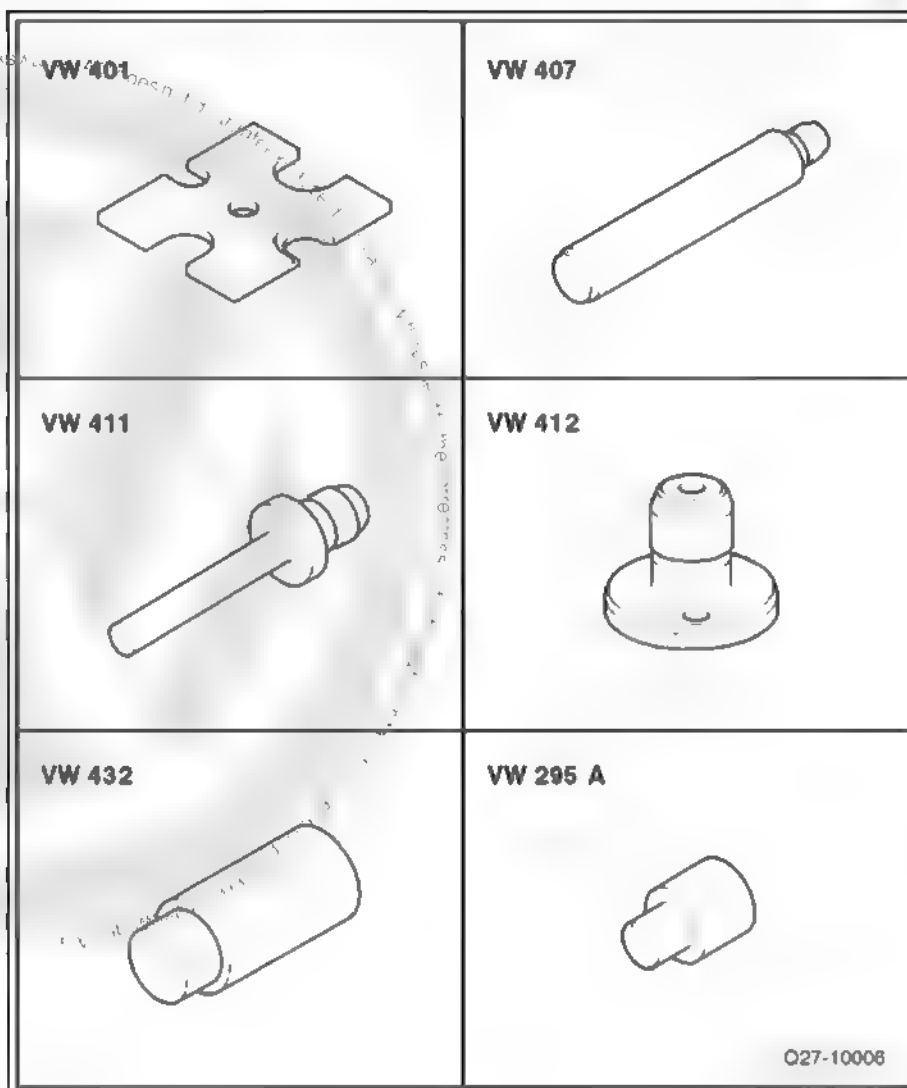
2.3.5 Bearing Bushing - remove and install





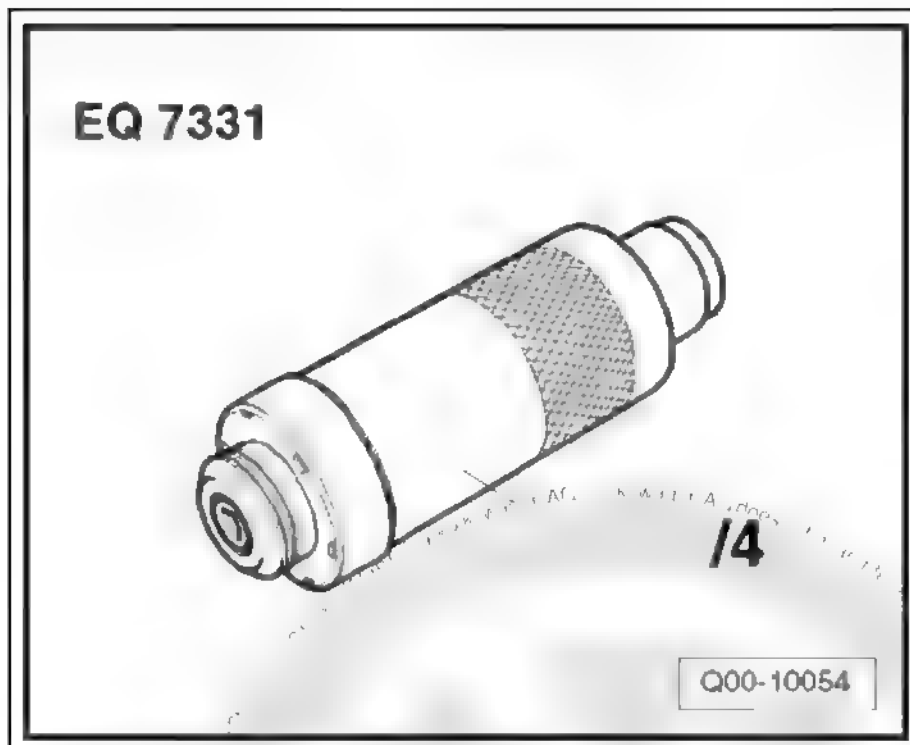
Special tools and workshop equipment required

- ◆ Plate - VW 401-
- ◆ Pressure pin - VW 407-
- ◆ Pressure pin - VW 411-
- ◆ Pressure disc - VW 412-
- ◆ Pressure base - VW 432-
- ◆ Base - VW 295A-





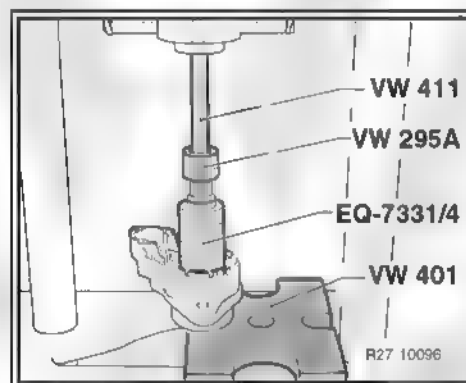
- ◆ Pressing tool - EQ 7331/4-



Bearing bushing removal:

- Support the case on Plate - VW 401- and remove the bearing bushing with the circlip.

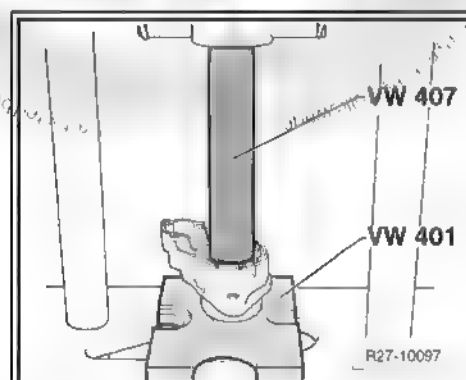
Bearing bushing installation:



- Install the bushing on case to the stop, by using the Pressure pin - VW 407- .

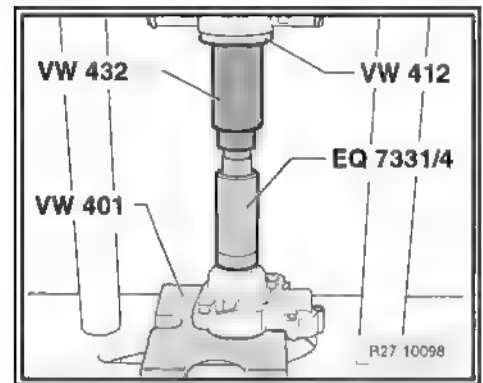
Sealing ring installation:

- Fit sealing ring on case.





- Support case on the Plate - VW 401- and re-drive by using the Pressing tool - EQ-7331/4- .



2.4 Tightening torques - Starter

Location	Tightening torques	
Starter to transmission	M12	80 Nm
Starter to transmission	M10	40 Nm
Earth strap	M8	15 Nm
Cable support	M8	15 Nm
positive wire to electromagnetic switch	M8	15 Nm





3 Alternator



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Refer to Generator (Alternator) - C- : ⇒ Manual "Current flow diagram", Troubleshooting in the Electrical System and Installation Locations.
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

3.1 Generator (Alternator) - C- - fastening cable (B+)

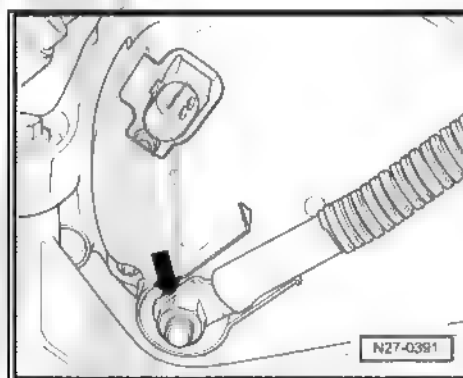


Caution

If the (B+) cable is not tightened to the torque specified, the following hazards may occur:

- The battery - A- does not charge completely.
- Total collapse of the vehicle electrical/electronic system (car damaged).
- Fire hazard due to production of sparks.
- Failures due to excessive charge in electronic components and control units.

Observe the tightening torque for the fastening nut -arrow- on cable (B+) → [page 56](#).





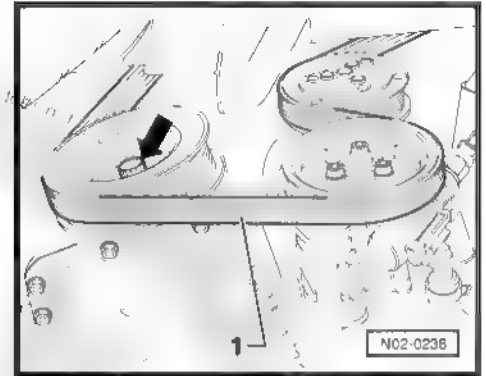
3.2 Generator (Alternator) - C- - check Poly-V belt



Note

If failures are detected, the Poly-V belt must be replaced to prevent operation failures or anomalies

- Turn engine manually using the crankshaft pulley -arrow-.
- With the vehicle raised, check Poly-V belt -1- for:
 - ◆ Cracks in the lower section (slots, central fractures, transversal fractures)
 - ◆ Layer separation (cover layer, cords)
 - ◆ Fissure on lower section
 - ◆ Fraying of cord strands
 - ◆ Worn sides (material wearing, frayed sides, side hardening - glassy sides), surface cracks.
 - ◆ Contact with oil and grease.



3.3 Generator (Alternator) - C- for 1.0 and 1.6-litre (CCNA, CCRA, CFZA) engines assembly overview

Vehicles with air conditioning:



1 - Support

- ☐ For vehicles with air conditioning.

2 - Voltage regulator - C1-

- ☐ (Bosch) - disassemble and assemble ➔ [page 54](#).
- ☐ (Valeo) - disassemble and assemble ➔ [page 55](#).

3 - Protection cover

4 - Generator (Alternator) - C-

- ☐ Remove and install ➔ [page 31](#).
- ☐ Check (B+) cable connection ➔ [page 28](#).
- ☐ Replace the Poly-V belt pulley ➔ [page 52](#).

5 - Poly-V belt (elastic)

- ☐ Remove and install ➔ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- ☐ Check the Poly-V belt ➔ [page 29](#).
- ☐ Poly-V belt run ➔ Engine; Rep. gr. 13 ; Crankshaft, pistons .

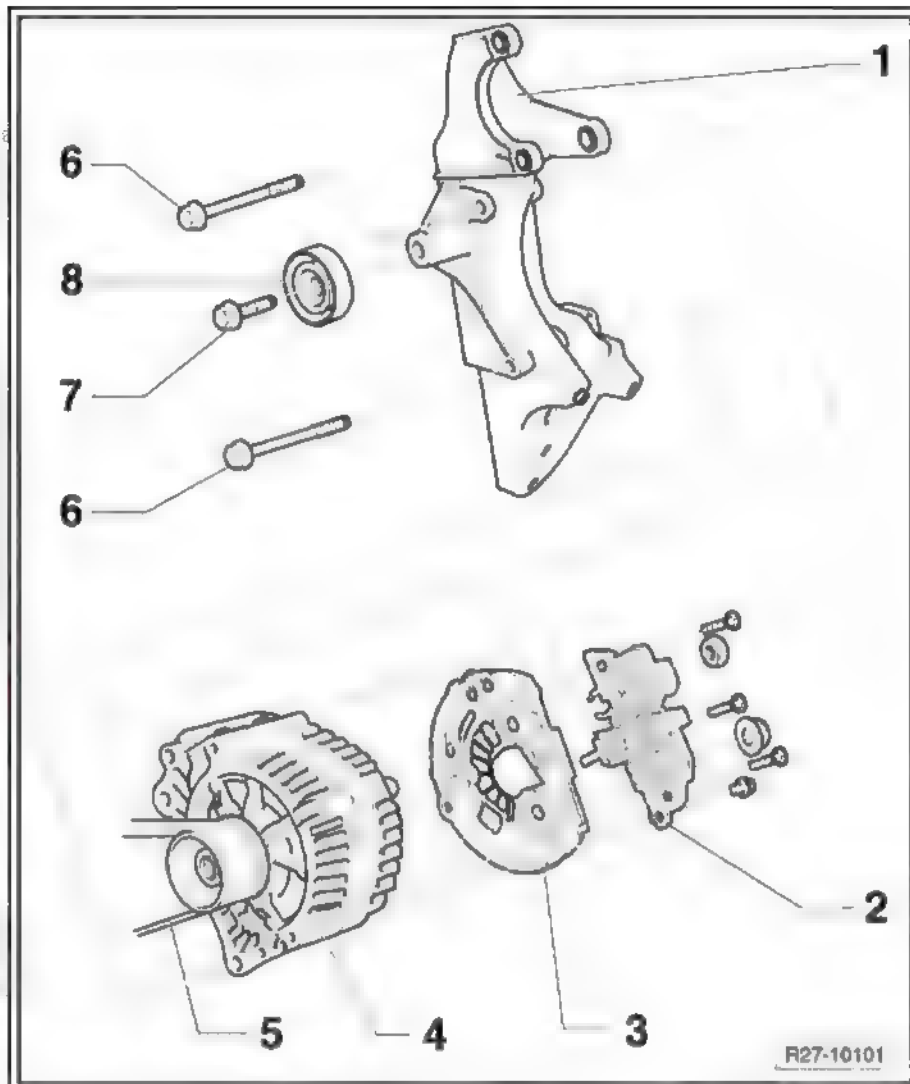
6 - Screws

- ☐ 23 Nm.

7 - Screw

- ☐ 45 Nm.

8 - Return pulley



Vehicles without air conditioning:



1 - Support

- ☐ For vehicles without air conditioning.

2 - Voltage regulator - C1-

- ☐ (Bosch) - disassemble and assemble
⇒ [page 54](#) .
- ☐ (Valeo) - disassemble and assemble
⇒ [page 55](#) .

3 - Protection cover

4 - Generator (Alternator) - C-

- ☐ Remove and install
⇒ [page 31](#) .
- ☐ Check (B+) cable connection ⇒ [page 28](#) .
- ☐ Replace the Poly-V belt pulley ⇒ [page 52](#) .

5 - Poly-V belt (elastic)

- ☐ Remove and install ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- ☐ Check the Poly-V belt ⇒ [page 29](#) .
- ☐ Poly-V belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .

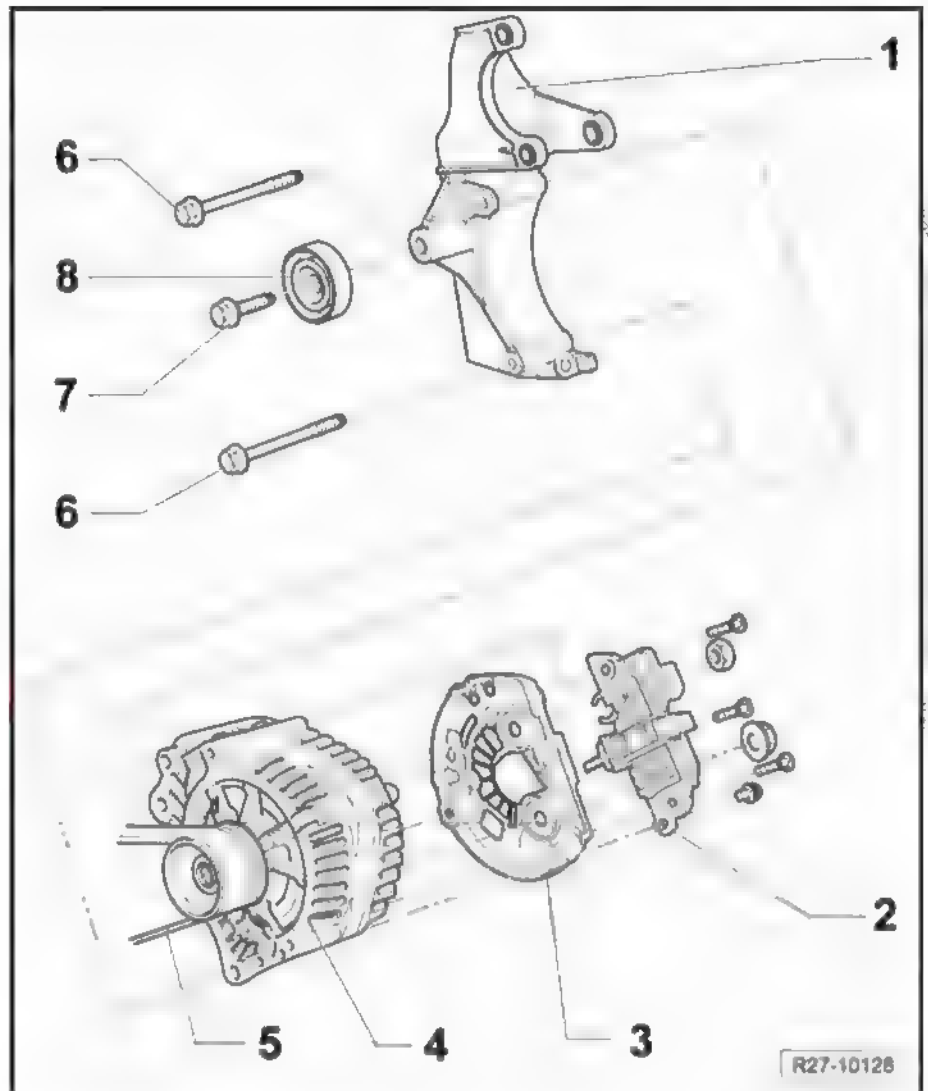
6 - Screws

- ☐ 23 Nm.

7 - Screw

- ☐ 45 Nm.

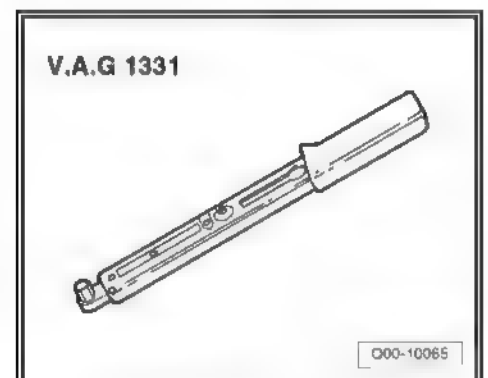
8 - Return pulley



3.3.1 Generator (Alternator) - C- for 1.0 and 1.6-litre (CCNA, CCRA) engines - remove and install

Special tools and workshop equipment required

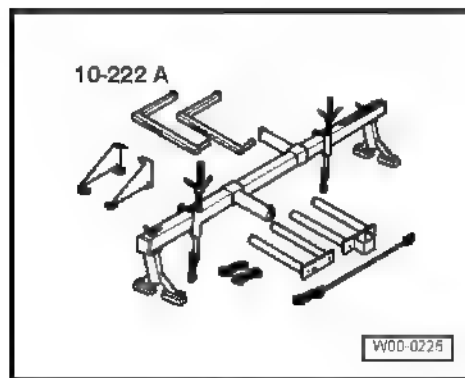
- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-



- ◆ Support - 10-222A-
- ◆ Claws - 10-222 A/1-

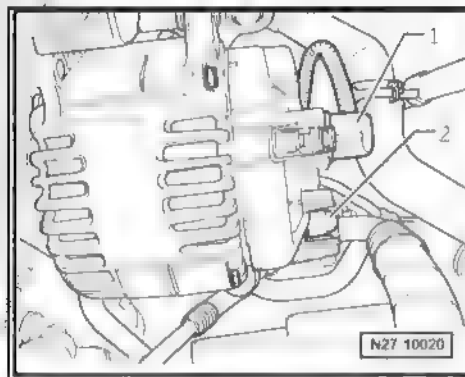


◆ Adapter - T02007-

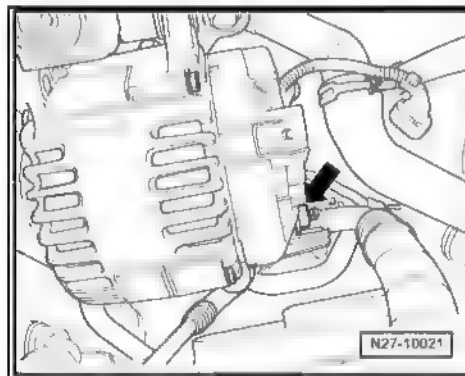


Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Remove the engine cover ⇒ Engine; Rep. gr. 24 ; Supply system, fuel injection .
- Remove the lower engine noise insulation, if necessary ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - Front section .
- Mark the Poly-V belt movement direction.
- Remove Poly-V (elastic) belt⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Disengage connector -1- and remove protective cover -2-.



- Loosen the fastening nut -arrow- (15 Nm) of cable (B+), then remove the cable.

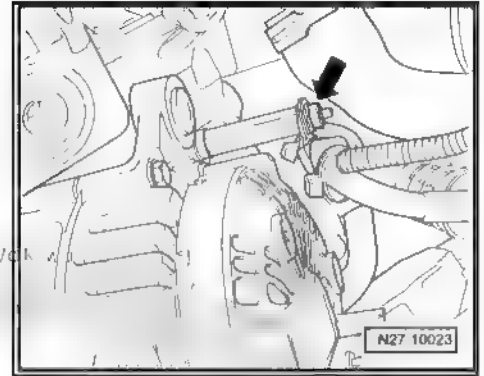




- Loosen the fastening nut -arrow- (4.5 Nm) of the Generator (Alternator) - C- cable support.

Continuation for:

Vehicles without air conditioning and with/without power steering:

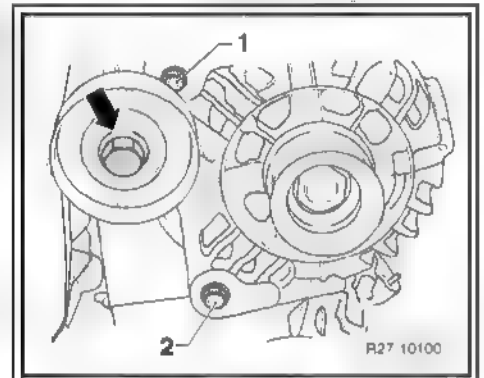


- Loosen the fastening screw -arrow- (45 Nm) of the return pulley, and remove the pulley.
- Loosen fastening screws -1 and 2- (23 Nm) of the Generator (Alternator) - C- .



Note

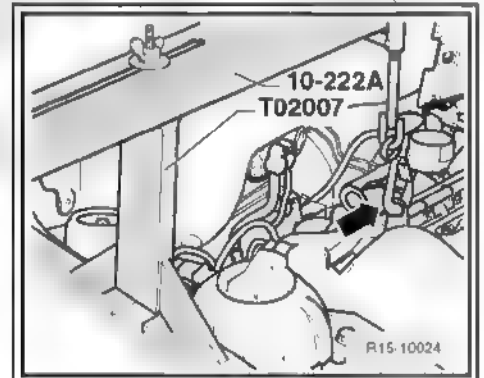
For the CrossFox, it is necessary to raise the engine assembly (approximately 5 to 10 mm) to facilitate the removal of the top fastening screw -1- on Generator (Alternator) - C- .



WARNING

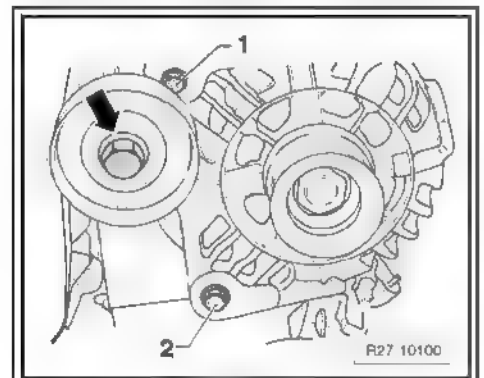
Do not loosen screws on the powertrain support.

- Place the Support or VW 061 - 10-222A- , with Claws - 10-222 A/1- and Adapter - T02007- , and support engine in position.



- Raise the assembly by the right side (approx. 5 to 10 mm) so to release the upper fastening screw -1- on Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- from its support

Vehicles with air conditioning and power steering:





- Loosen the fastening screw -arrow- (10 Nm) on the compensation reservoir.
- Remove the compensation reservoir from its support to facilitate access to the return pulley.



WARNING

Please move the compensation reservoir and support it carefully.

- Remove the pulley from the power steering pump ⇒ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Remove the Poly-V (elastic) belt from the air conditioning compressor ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Remove the air conditioning compressor from its support ⇒ Heating, air conditioning; Rep. gr. 87 ; Heating to clear space for passage of the Generator (Alternator) - C- .



WARNING

The refrigerant gas circuit should not be opened.

Pay attention so that the flexible refrigerant hoses from the compressor are not pulled tight, mounting the compressor to the body with an adequate alternative mean, such as, for example, a wire.

- Loosen the fastening screw -arrow- (45 Nm) of the return pulley, and remove the pulley.
- Loosen fastening screws -1- and -2- (23 Nm) of the Generator (Alternator) - C- .



Note

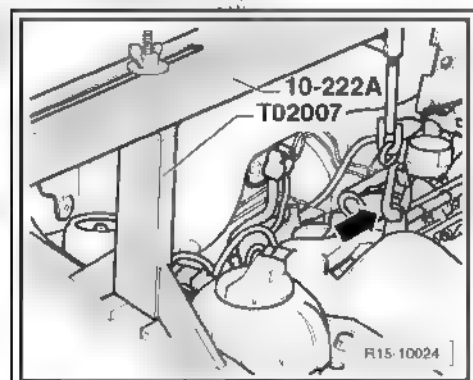
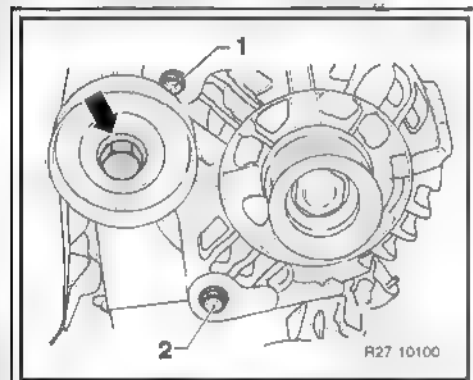
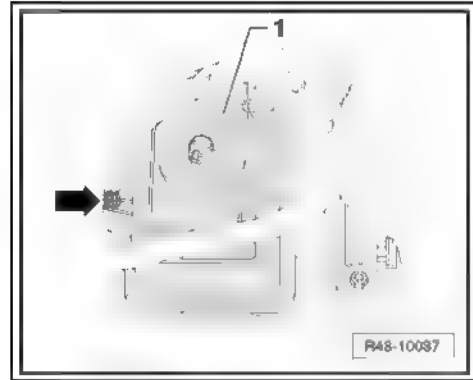
For the CrossFox, it is necessary to raise the engine assembly (approximately 5 to 10 mm) to facilitate the removal of the top fastening screw -1- on Generator (Alternator) - C- .



WARNING

Do not loosen screws on the powertrain support.

- Place the Support or VW 061 - 10-222A- , with Claws - 10-222 A/1- and Adapter - T02007- , and support engine in position



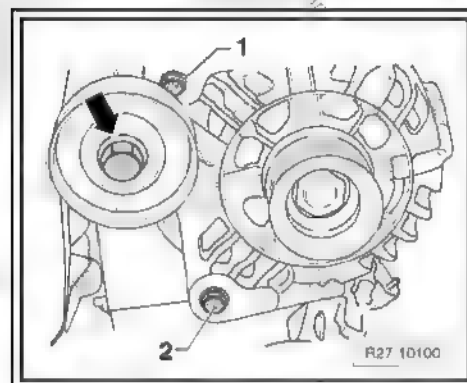


- Raise the assembly by the right side (approx. 5 to 10 mm) so as to release the upper fastening screw -1- on Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning pulley, as indicated on the belt run \Rightarrow Engine, Rep. gr. 13 ; Crankshaft, pistons .
- Tighten the fastening nuts and screws to the specified tightening torque \Rightarrow [page 56](#) .



Note

After installation, start the engine and check the belt motion.

3.4 Generator (Alternator) - C- for 1.0 and 1.6-litre (BJE, BNX, BAH, BPA) engines - assembly overview

1 - Support

2 - Voltage regulator - C1-

- ☐ (Bosch) - disassemble and assemble \Rightarrow [page 54](#) .
- ☐ (Valeo) - disassemble and assemble \Rightarrow [page 55](#) .

3 - Protection cover

4 - Generator (Alternator) - C-

- ☐ Remove and install \Rightarrow [page 36](#) .
- ☐ Check (B+) cable connection \Rightarrow [page 28](#) .
- ☐ Replace the Poly-V belt pulley \Rightarrow [page 52](#) .

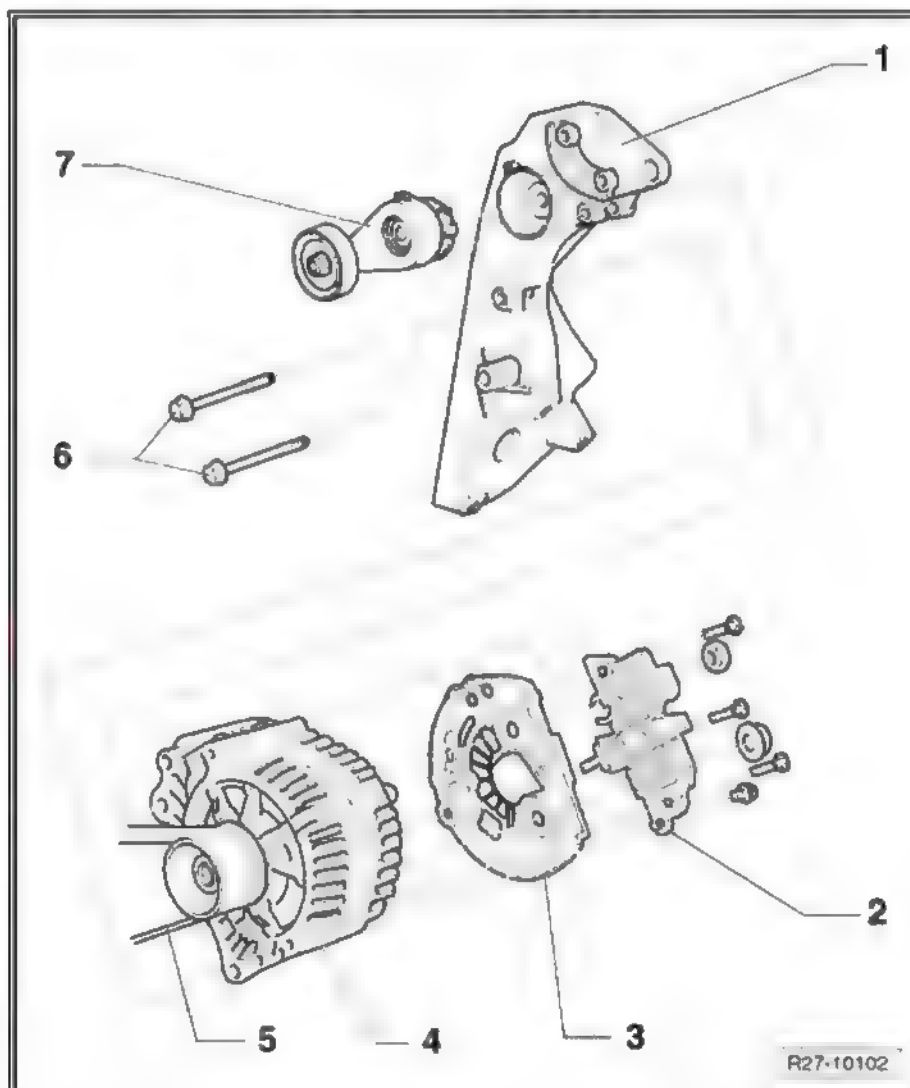
5 - Poly-V belt

- ☐ Remove and install \Rightarrow Engine; Rep. gr. 13 ; Crankshaft, pistons .
- ☐ Check the Poly-V belt \Rightarrow [page 29](#) .
- ☐ Poly-V belt run \Rightarrow Engine, Rep. gr. 13 ; Crankshaft, pistons .

6 - Screws

- ☐ 23 Nm

7 - Tensioning element

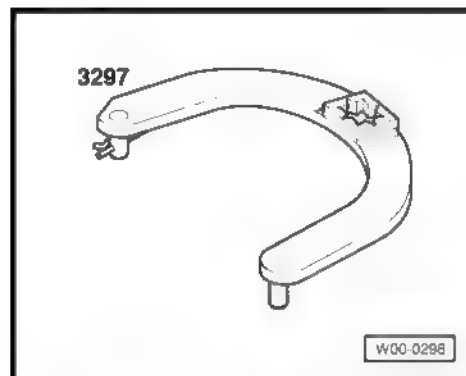




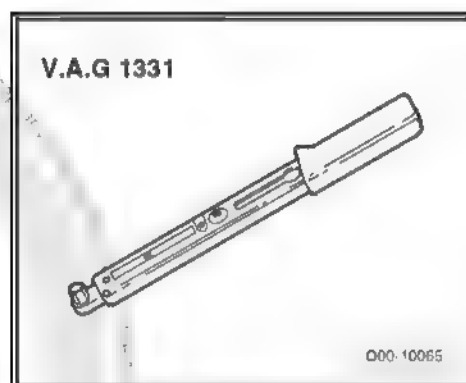
3.4.1 Generator (Alternator) - C- for 1.0 and 1.6-litre (BJE, BNX, BAH, BPA) engines - remove and install

Special tools and workshop equipment required

◆ Lever - 3297- or -VW 5329/7-

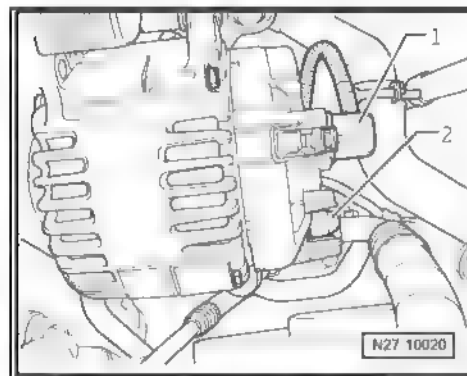


◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-



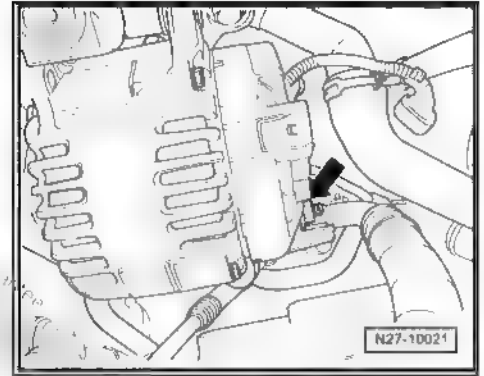
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the engine cover ⇒ Engine; Rep. gr. 24 ; Supply system - fuel injection .
- Remove the lower engine noise insulation, if necessary ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - Front section .
- Disengage connector -1- and remove protective cover -2-





- Loosen the fastening nut -arrow- (15 Nm) of cable (B+), then remove the cable

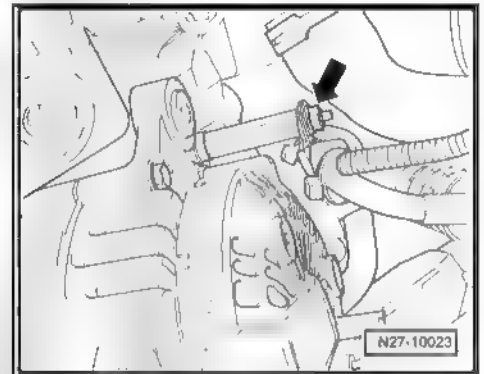


- Loosen the fastening nut -arrow- (4.5 Nm) of the Generator (Alternator) - C- cable support.

Continuation for:

Vehicles with air conditioning and power steering:

- Mark the Poly-V belt movement direction.
- Remove Poly-V belt ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .

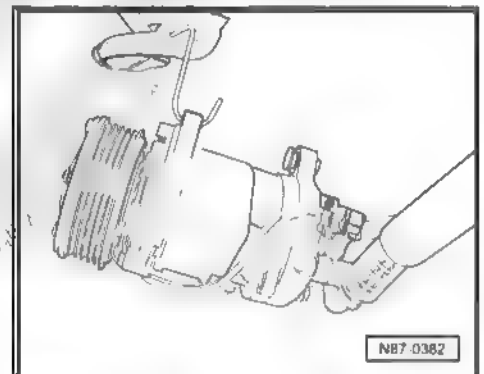


- Release the air conditioning compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioning and fasten the air conditioning compressor to the body.



Note

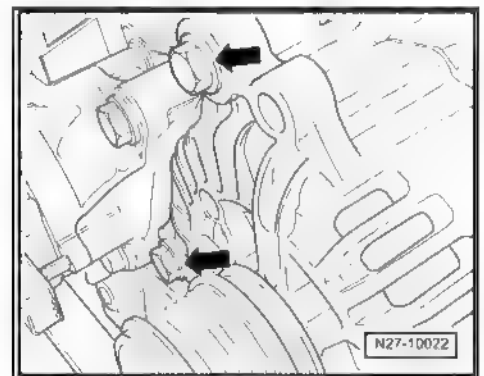
Make sure that the flexible refrigerant hoses on the compressor remain unstressed.



- Loosen fastening screws -arrows- (23 Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

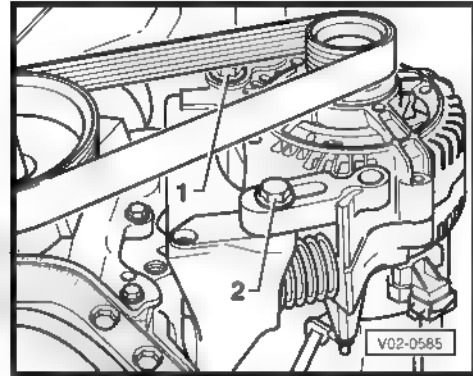
Vehicles without air conditioning and with and/or without power steering:

- Mark the Poly-V belt movement direction.

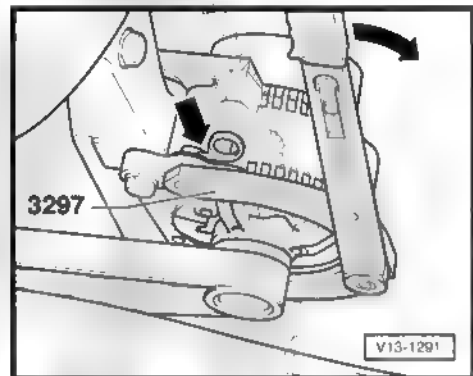




- Loosen the fastening screws -1 and 2- (23 Nm) of the Generator (Alternator) - C-, by at least one turn



- Position the Lever - 3297-, lock with fitting pin and turn the Generator (Alternator) - C- downwards (with the Lever - 3297- operation, utilize for example the torque wrench).
- Remove Poly-V belt ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .





- Loosen fastening screws -arrows- (23Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

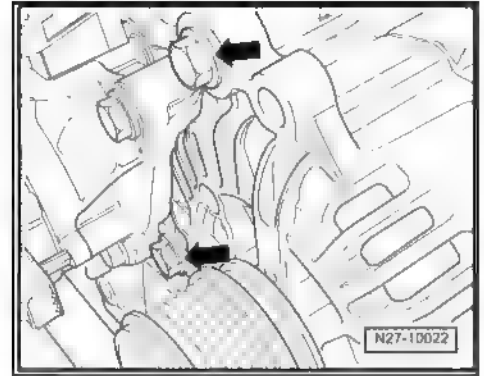
Installation:

Installation is performed in reverse sequence to the removal, considering the following:

Continuation for:

Vehicles with air conditioning:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning roller, as indicated on the belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 56](#) .



Note

After installation, start the engine and check the belt motion.

Vehicles without air conditioning and with and/or without power steering:

- Press the Generator (Alternator) - C- up to the tensioning spring stop with the Lever - 3297- at least three times, to ensure correct belt seating.
- Then press the Generator (Alternator) - C- with the Lever - 3297- against the belt tensioning element until the Poly-V belt can be installed on the pulley.
- After placing the Poly-V belt, turn the engine several times with the Generator (Alternator) - C- loosened (approx. 11 revs). For that, slightly start the Engine - B- .



Note

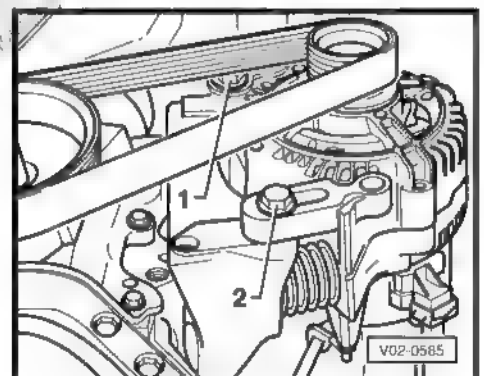
When tightening the Generator (Alternator) - C- fastening screws, observe the tightening sequence and do not touch the Poly-V belt.

- First, tighten fastening screw -2-, then fastening screw -1-.
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 56](#) .



Note

After installation, start the engine and check the belt motion.



3.5 Generator (Alternator) - C- for 1.4-litre diesel (BNM) engine - assembly overview



1 - Support

2 - Voltage regulator - C1-

- ☐ (Bosch) - disassemble and assemble
→ [page 54](#) .
- ☐ (Valeo) - disassemble and assemble
→ [page 55](#) .

3 - Protection cover

4 - Generator (Alternator) - C-

- ☐ Remove and install
→ [page 40](#) .
- ☐ Check (B+) cable connection → [page 28](#) .
- ☐ Replace the Poly-V belt pulley → [page 52](#) .

5 - Poly-V belt

- ☐ Remove and install → Engine; Rep. gr. 13 ; Crankshaft, pistons .
- ☐ Check the Poly-V belt → [page 29](#) .
- ☐ Poly-V belt run → Engine; Rep. gr. 13 ; Crankshaft, pistons .

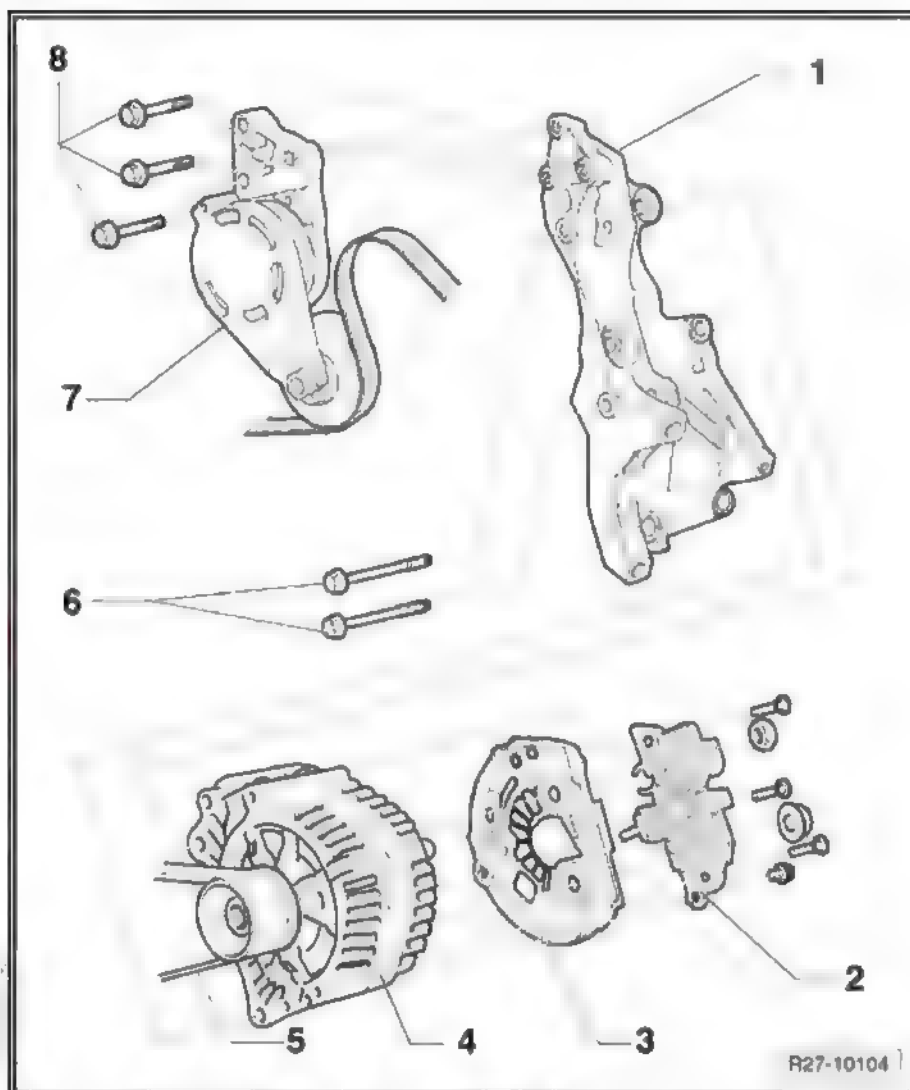
6 - Screws

- ☐ 23 Nm.

7 - Tensioning element

8 - Screws

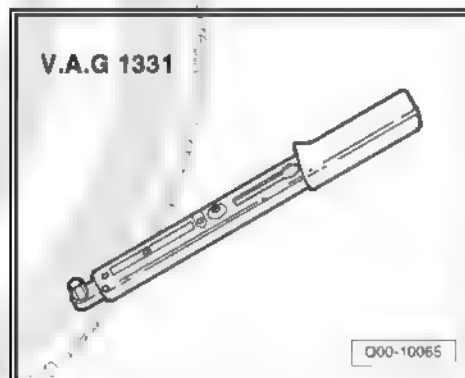
- ☐ 25 Nm.



3.5.1 Generator (Alternator) - C- for 1.4-litre (BNM) diesel engine - remove and install

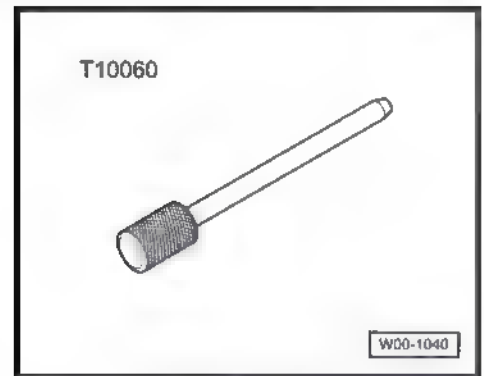
Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-



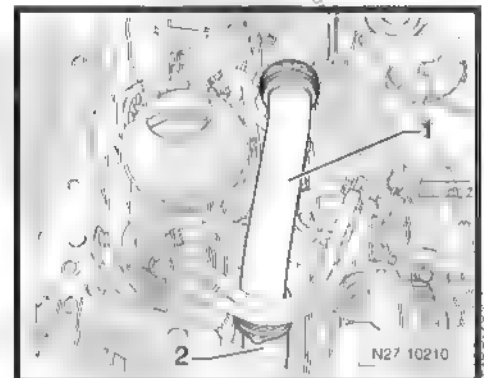


◆ Pin - T 10060-

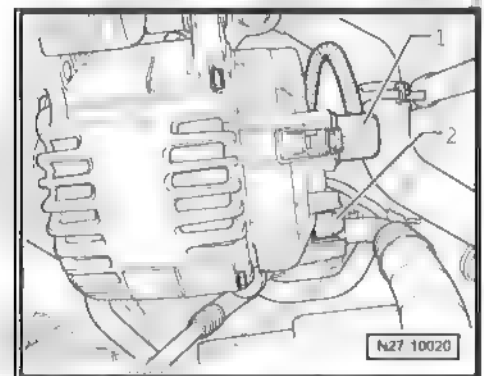


Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove engine cover panel, if required ➔ Engine; Rep. gr. 23 ; Supply system - mechanical fuel injection (diesel)
- Remove the lower engine noise insulation ➔ General body repairs, exterior; Rep. gr. 50 ; Body - front section .
- Remove the hose between the intercooler intake flange and the air mass meter.

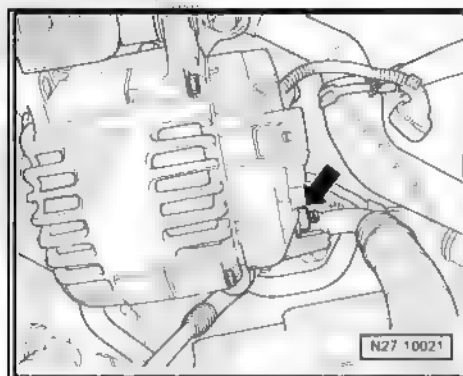


- Disengage connector -1- and remove protective cover -2-.

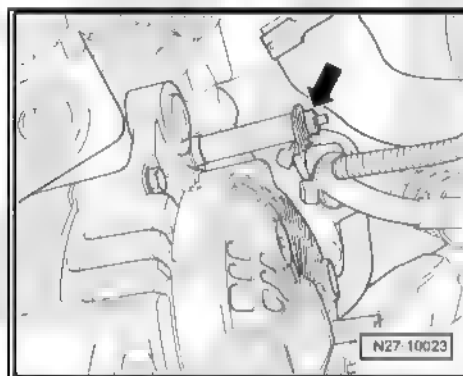




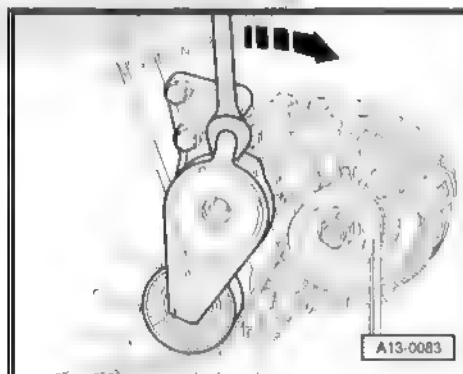
- Loosen the fastening nut -arrow- (15 Nm) of cable (B+), then remove the cable.



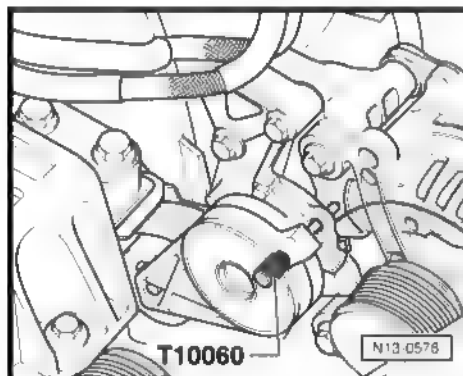
- Loosen the fastening nut -arrow- (4.5 Nm) of the Generator (Alternator) - C- cable support.
- Mark the Poly-V belt movement direction.



- Move the tensioning element towards the -arrow- to relieve the Poly-V belt tension.



- Lock the tensioning element with the Pin - T10060A- .
- Remove the Poly-V belt.



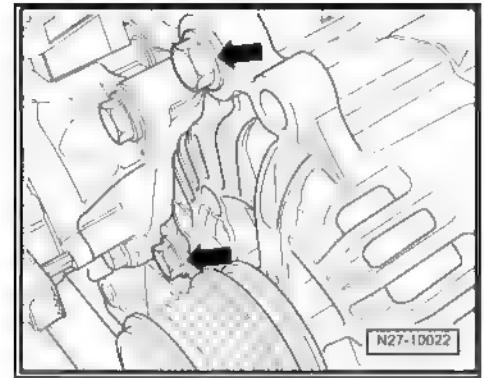


- Loosen fastening screws -arrows- (23 Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning roller, as indicated on the belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 56](#) .



Note

After installation, start the engine and check the belt motion.

3.6 Generator (Alternator) - C- for 1.9-litre (ASY) diesel engine - assembly overview

1 - Support

2 - Screw

- ☐ 20 Nm + 90°.
- ☐ Always replace when removed

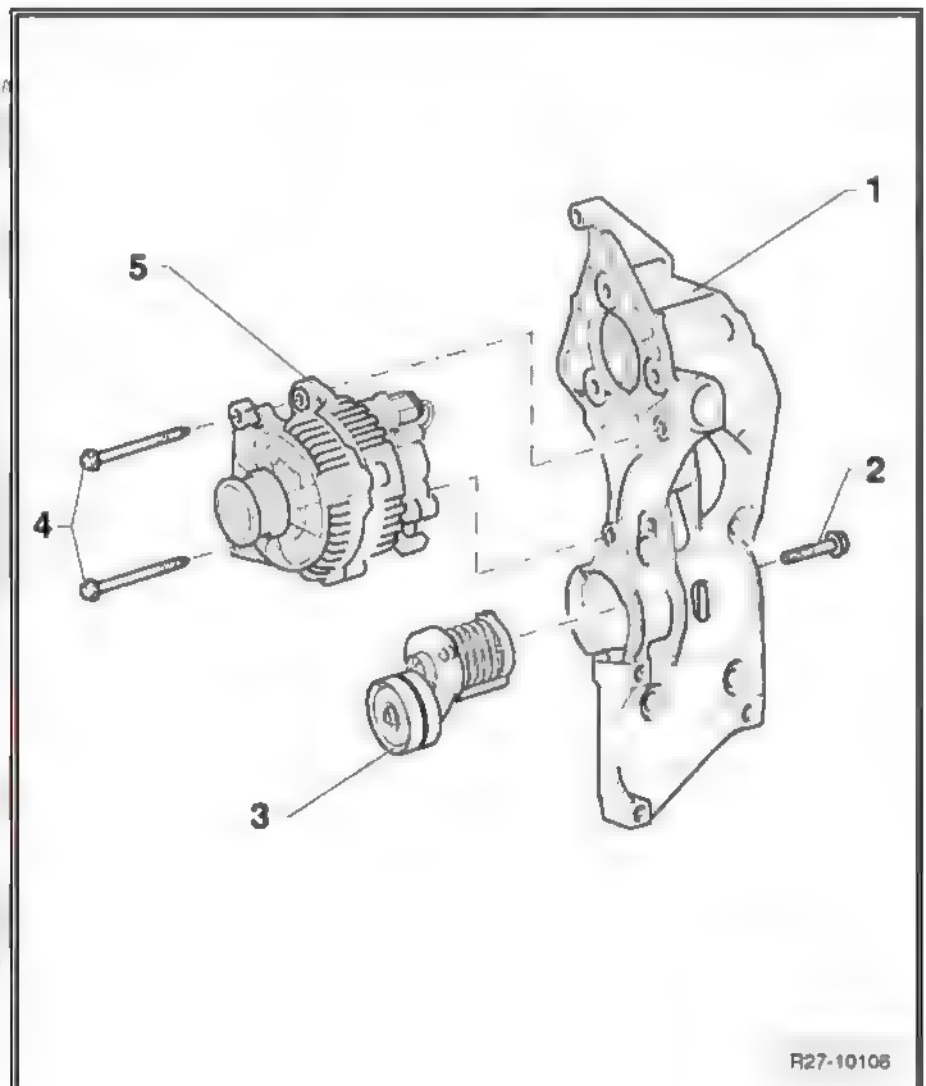
3 - Tensioning element

4 - Screws

- ☐ 25 Nm.
- ☐ Replace whenever removed.

5 - Generator (Alternator) - C-

- ☐ Remove and install ⇒ [page 44](#) .
- ☐ Check (B+) cable connection ⇒ [page 28](#) .
- ☐ Replace the Poly-V belt pulley ⇒ [page 52](#) .

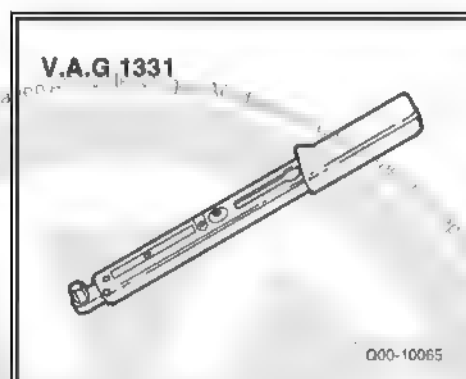




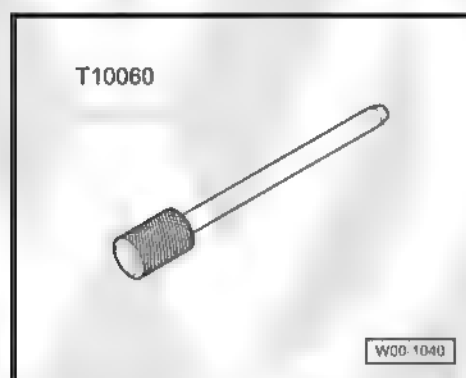
3.6.1 Generator (Alternator) - C- for 1.9-litre (ASY) diesel engine - remove and install

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-

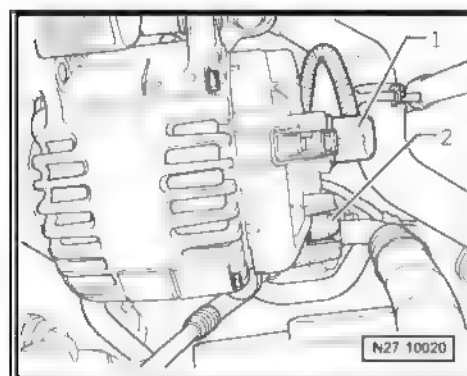


- ◆ Pin - T 10060-



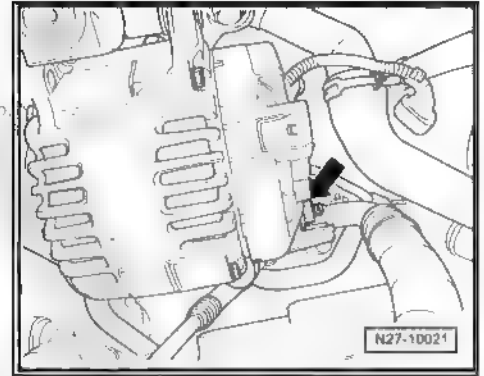
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove engine cover panel ⇒ Engine; Rep. gr. 23 ; Supply system - fuel injection (diesel) .
- Remove the lower engine noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - front section .
- Disengage connector -1- and remove protective cover -2-.





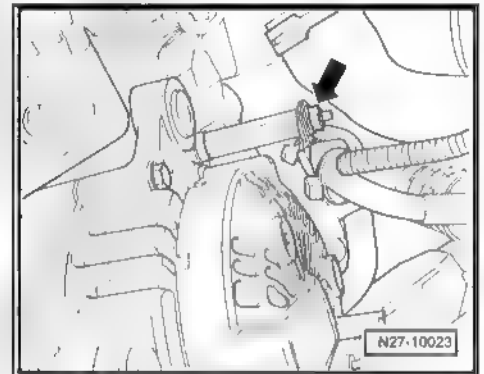
- Loosen the fastening nut -arrow- (15 Nm) of cable (B+), then remove the cable.



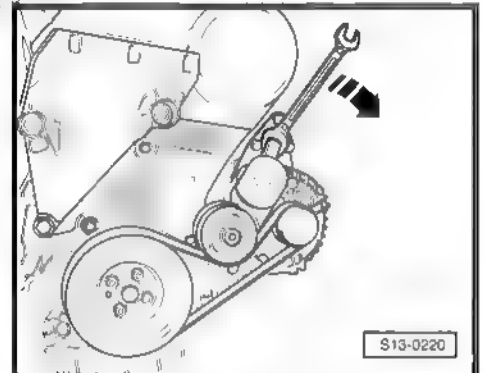
- Loosen the fastening nut -arrow- (4.5 Nm) of the Generator (Alternator) - C- cable support.
- Mark the Poly-V belt movement direction.

Continuation for:

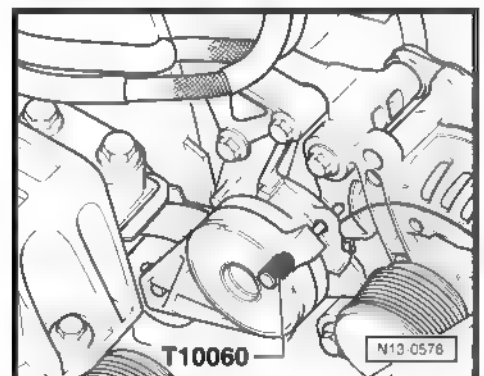
Vehicles without air conditioning:



- Move the tensioning element towards the -arrow- to relieve the Poly-V belt tension.



- Lock the tensioning element with the Pin - T10060A- .
- Remove the Poly-V belt.





- Loosen fastening screws -arrows- (25 Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

Vehicles with air conditioning:

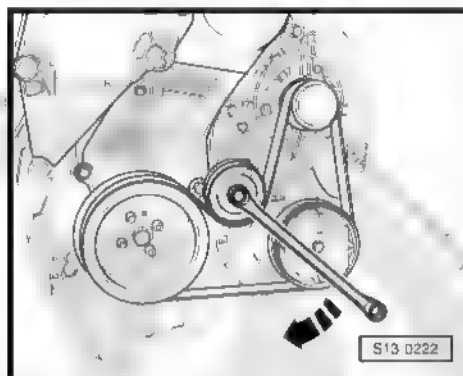
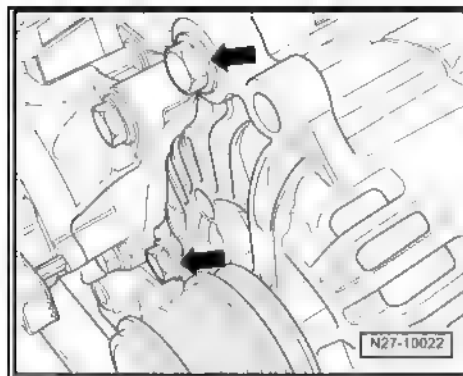
- Move the tensioning element towards -arrow- to relieve Poly-V belt tension.
- Remove the Poly-V belt.

- Loosen fastening screws -arrows- (25 Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning roller, as indicated on the belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 56](#) .



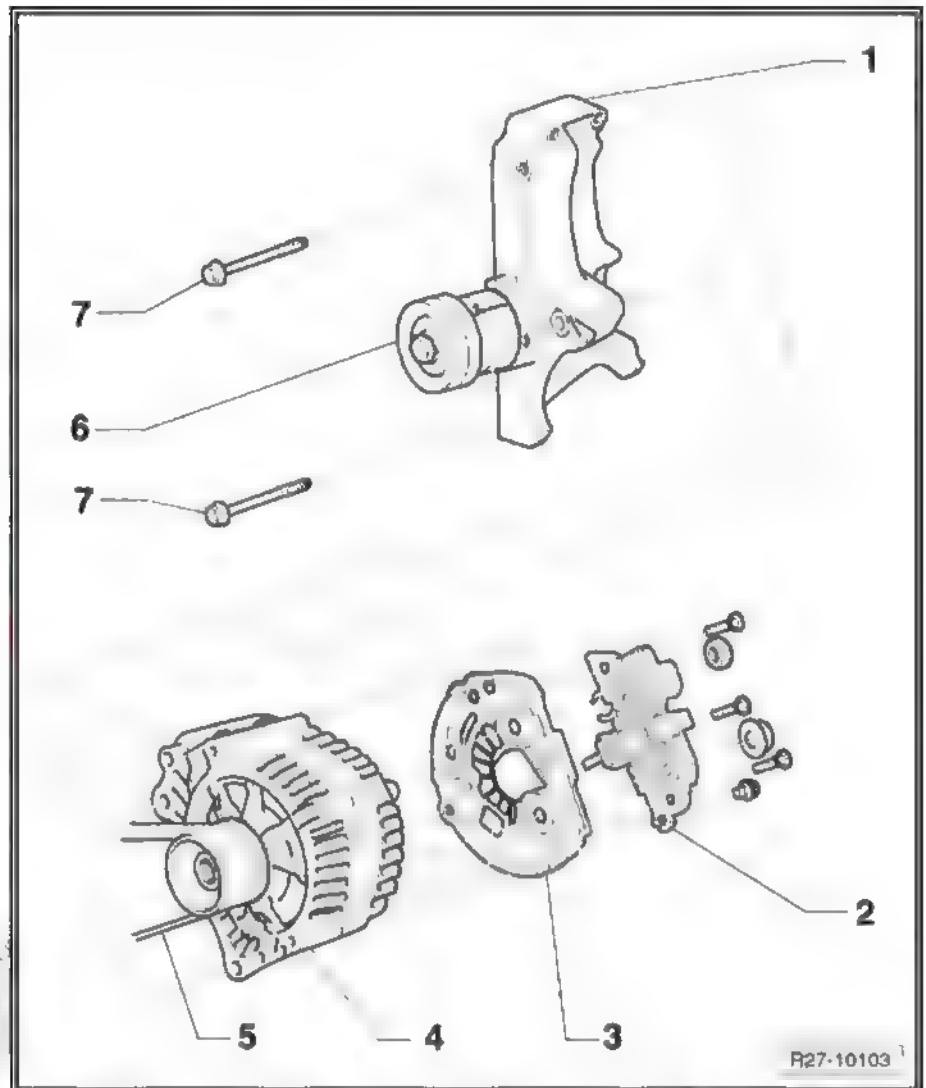
Note

After installation, start the **engine** and check the belt motion.

3.7 Generator (Alternator) - C- for 1.4-litre (BKR) engine - assembly overview



- 1 - Support
- 2 - Voltage regulator - C1-
 - ☐ (Bosch) - disassemble and assemble ⇒ [page 54](#) .
 - ☐ (Valeo) - disassemble and assemble ⇒ [page 55](#) .
- 3 - Protection cover
- 4 - Generator (Alternator) - C-
 - ☐ Remove and install ⇒ [page 47](#) .
 - ☐ Check (B+) cable connection ⇒ [page 28](#) .
 - ☐ Replace the Poly-V belt pulley ⇒ [page 52](#) .
- 5 - Poly-V belt
 - ☐ Remove and install ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
 - ☐ Check the Poly-V belt ⇒ [page 29](#) .
 - ☐ Poly-V belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- 6 - Tensioning element
- 7 - Screws
 - ☐ 25 Nm.

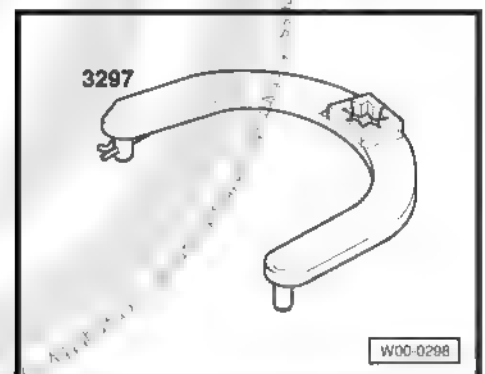


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3.7.1 Generator (Alternator) - C- for 1.4-litre (BKR) engine - remove and install

Special tools and workshop equipment required

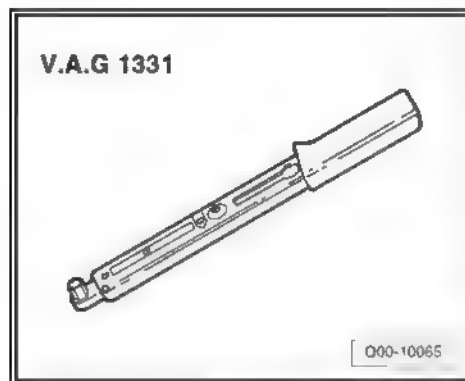
- ◆ 16-mm wrench
- ◆ Lever - 3297-



W00-0298



- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-



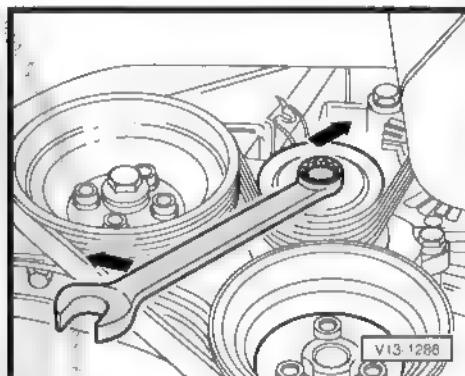
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the engine cover ⇒ Engine; Rep. gr. 24 ; Supply system - fuel injection .
- Remove the lower engine noise insulation, if necessary ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - front section .

Continuation for:

Vehicles with air conditioning:

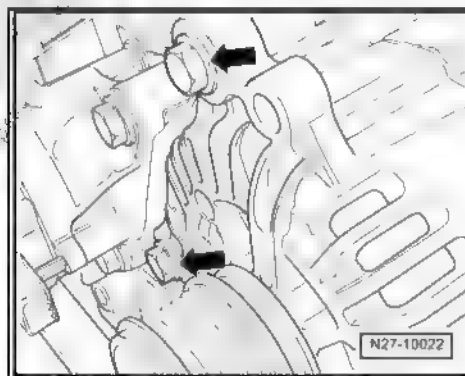
- Mark the Poly-V belt movement direction.
- To release the Poly-V belt, turn the belt tensioning element towards -arrow-, with a 16-mm spanner.
- Remove Poly-V belt ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .



- Loosen fastening screws -arrows- (25 Nm) of the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

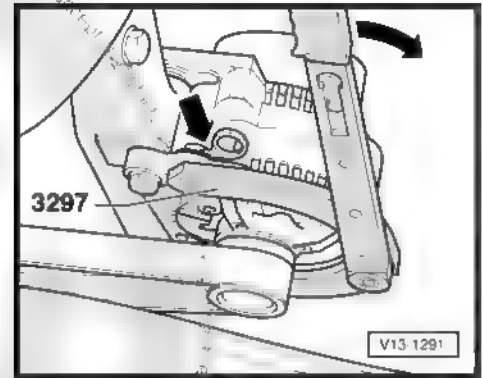
Vehicles without air conditioning:

- Mark the Poly-V belt movement direction.
- Loosen fastening screws -1 and 2- (25 Nm) by at least one turn.





- Position the Lever - 3297- , lock with the fitting pin, and turn the alternator downward (with the Lever - 3297- operation, use the torque wrench, for example).
- Remove Poly-V belt ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .

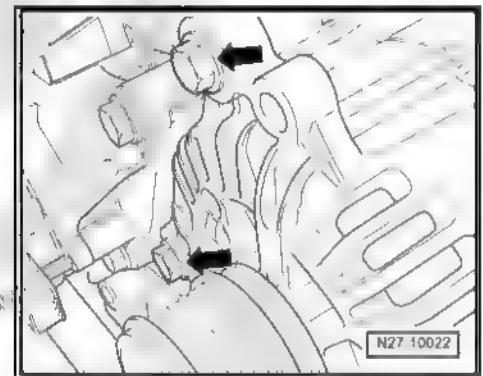


- Loosen the fastening screws -arrows- from the Generator (Alternator) - C- .
- Remove the Generator (Alternator) - C- .

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning roller, as indicated on the belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .



Note

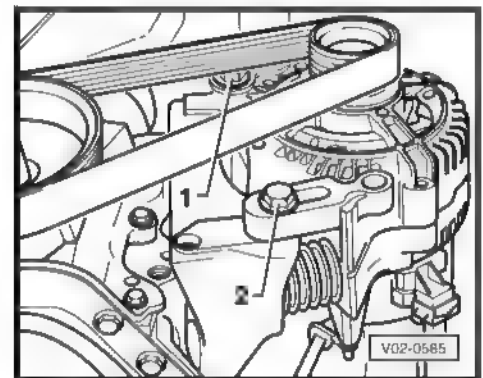
When tightening the Generator (Alternator) - C- fastening screws, observe the tightening sequence and do not touch the Poly-V belt.

- First, tighten fastening screw -2-, then fastening screw -1-.
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 56](#) .



Note

After installation, start the engine and check the belt motion.



3.8 Generator (Alternator) - C- for 1.2-litre (BMD) engine - assembly overview



1 - Engine

2 - Voltage regulator - C1-

- ☐ (Bosch) - disassemble and assemble
⇒ [page 54](#) .
- ☐ (Valeo) - disassemble and assemble
⇒ [page 55](#) .

3 - Protection cover

4 - Generator (Alternator) - C-

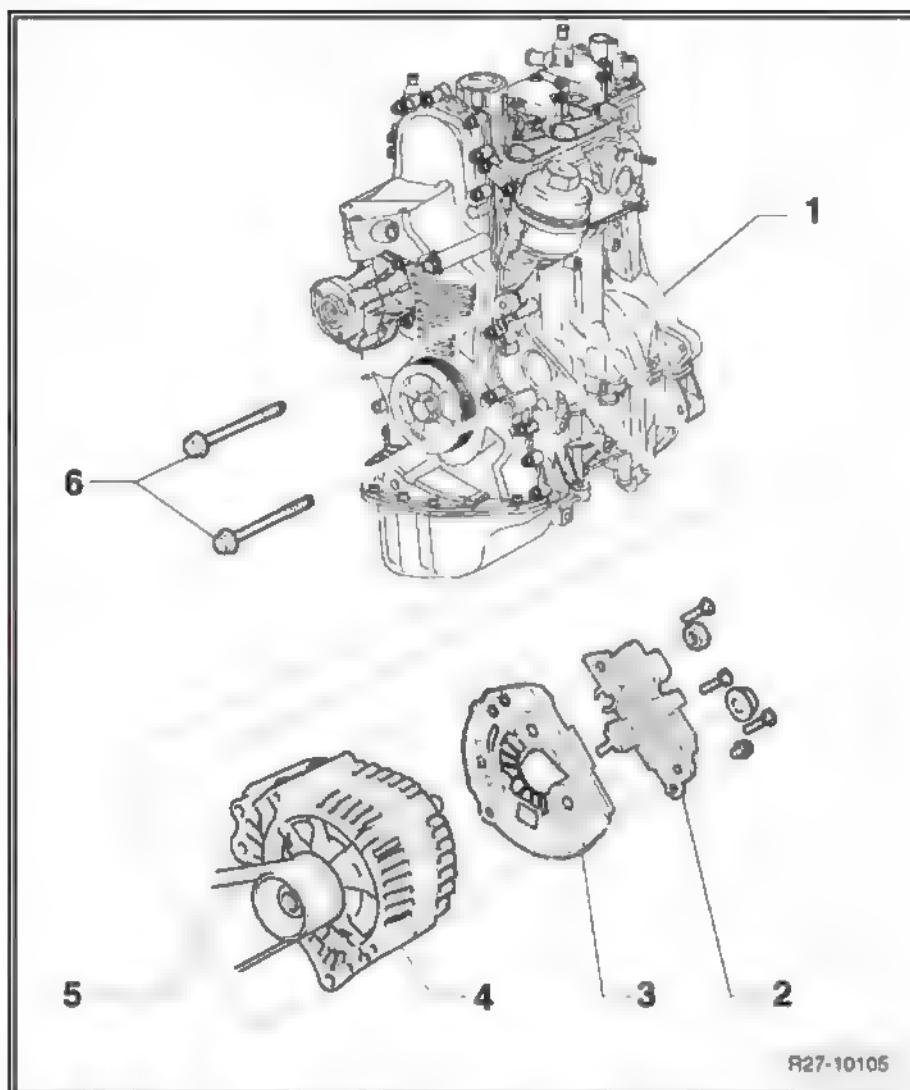
- ☐ Remove and install
⇒ [page 50](#) .
- ☐ Check (B+) cable connection ⇒ [page 28](#) .
- ☐ Replace the Poly-V belt pulley ⇒ [page 52](#) .

5 - Poly-V belt

- ☐ Remove and install ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- ☐ Check the Poly-V belt ⇒ [page 29](#) .
- ☐ Poly-V belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .

6 - Screws

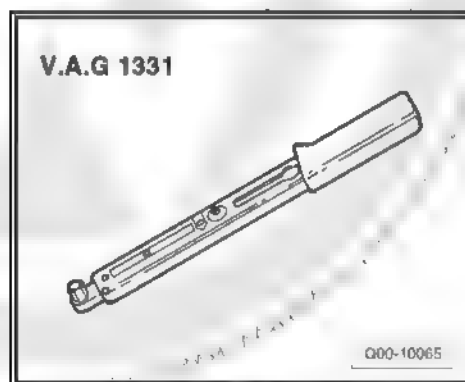
- ☐ 25 Nm.



3.8.1 Generator (Alternator) - C- for 1.2-litre (BMD) engine - remove and install

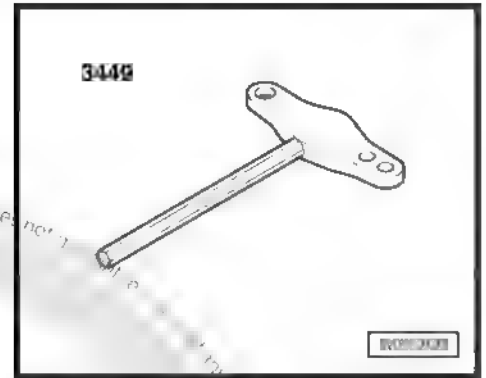
Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-



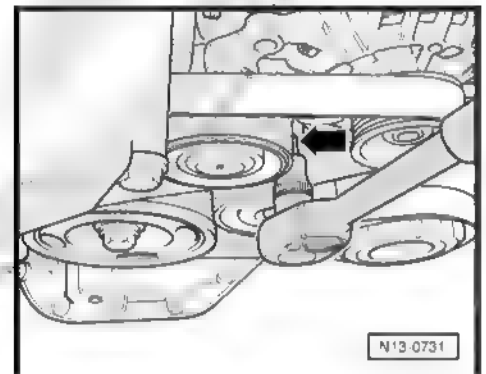


◆ Hexagonal wrench - 3449-

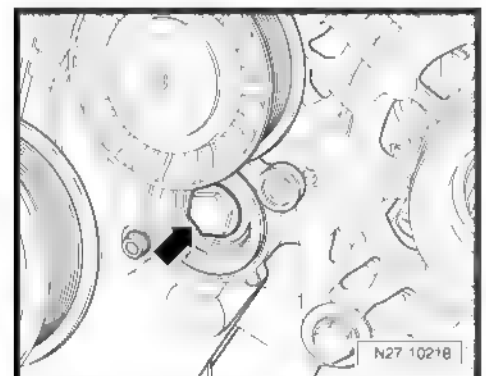


Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the engine cover ⇒ Engine; Rep. gr. 24 ; Supply system - fuel injection .
- Remove the lower engine noise insulation, if necessary ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - front section .
- Mark the Poly-V belt movement direction.
- Move the tensioning element towards the -arrow-, until the hole becomes visible. Hold the tensioning element with the Hexagonal wrench - 3449- .
- Remove the Poly-V belt.

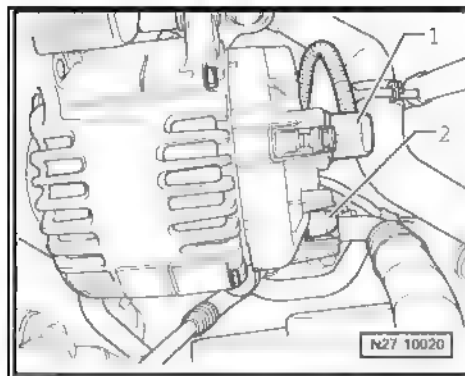


- Loosen fastening screw -arrow- of the tensioning element.
- Remove the tensioning element.

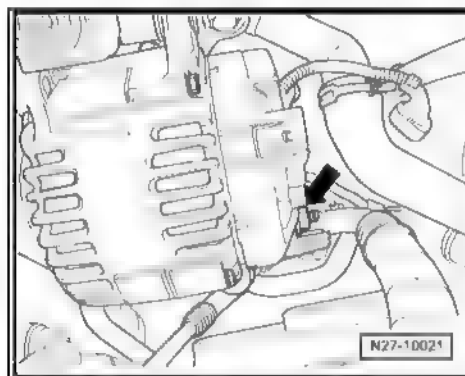




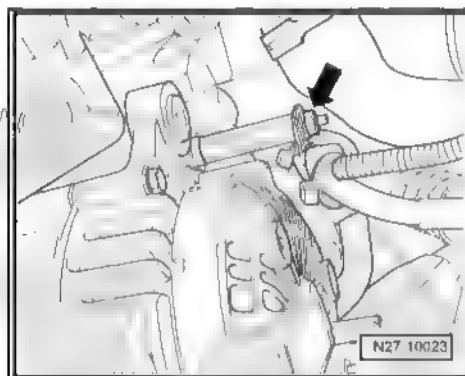
- Disengage connector -1- and remove protective cover -2-.



- Loosen the fastening nut -arrow- (15 Nm) of cable (B+), then remove the cable.



- Loosen the fastening nut -arrow- (4.5 Nm) of the Generator (Alternator) - C- cable support.



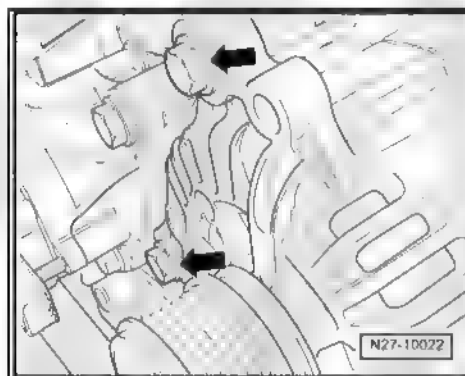
- Loosen fastening screws -arrows- (25 Nm) of the Generator (Alternator) - C- .

- Remove the Generator (Alternator) - C- .

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- First, place Poly-V belt on the crankshaft pulley, and then on the tensioning roller, as indicated on the belt run ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Tighten the fastening nuts and screws to the specified tightening torque → [page 56](#) .



Note

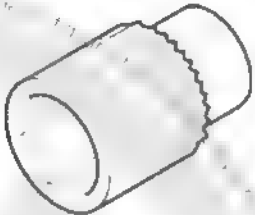
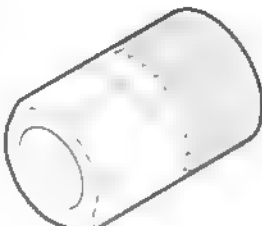
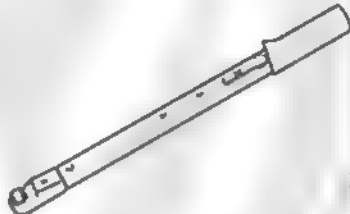
After installation, start the engine and check the belt motion.

3.9 Generator (Alternator) - C- - replace Poly-V belt pulley



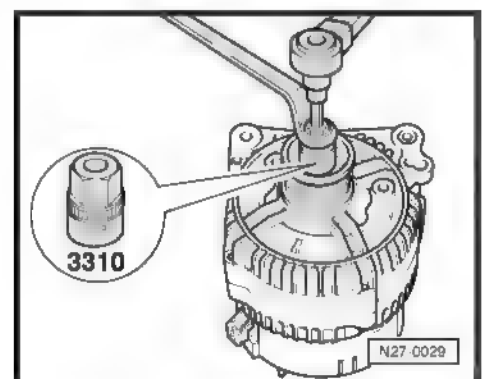
Special tools and workshop equipment required

- ◆ Adapter socket - 3310-
- ◆ Multi-tooth adapter - 3400-
- ◆ Torque wrench - 40 to 200 Nm (enc. 1/2") - VAG 1332-

<p>3310</p> 	<p>3400</p> 
<p>V.A.G. 1332</p> 	
	<p>Q27-10008</p>

3.9.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the Generator (Alternator) - C- ➤ [page 28](#) .
- Install the Generator (Alternator) - C- through its fastening points on a bench vise.
- Release the fastening nut from the Poly-V belt pulley without freewheel unit with the Adapter socket - 3310- , or the Multi-teeth adapter - 3400- for Poly-V belt pulley with freewheel unit.





3.9.2 Installation

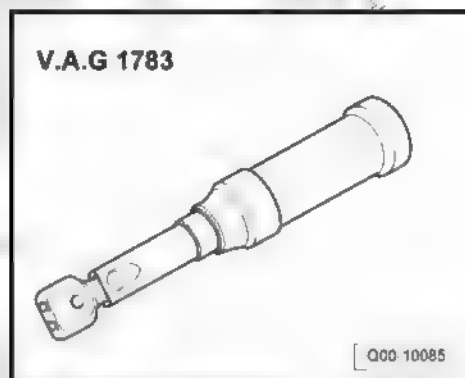
Installation is performed in reverse sequence to the removal, considering the following

- Tighten the fastening nut with the specified torque
→ [page 56](#) .

3.10 Voltage regulator - C1- (Manufacturer Bosch) - disassemble and assemble

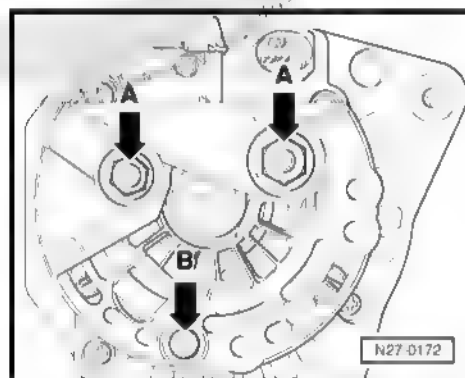
Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

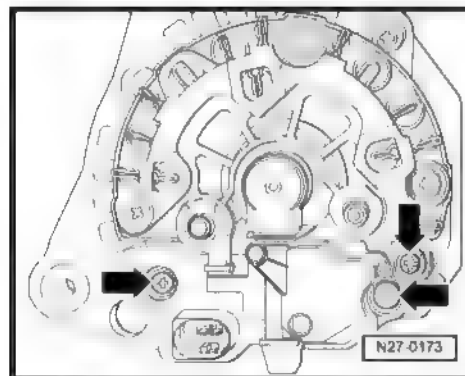


3.10.1 Disassembly

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the Generator (Alternator) - C- [page 28](#) .
- Loosen the fastening nuts -arrows A- and the fastening screw -arrow B- (4.5 Nm) from the protection cover and remove it.



- Loosen the fastening screws -arrows- (2 Nm) of the Voltage regulator - C1- .
- Remove the Voltage regulator - C1- .



3.10.2 Assembly

Assembly is performed in the reverse order to disassembly, observing the following:



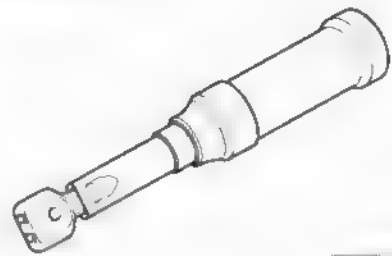
- Tighten the securing nuts and screws to the specified tightening torque ➤ [page 56](#) .

3.11 Voltage regulator - C1- (Manufacturer Valeo) - disassemble and assemble

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

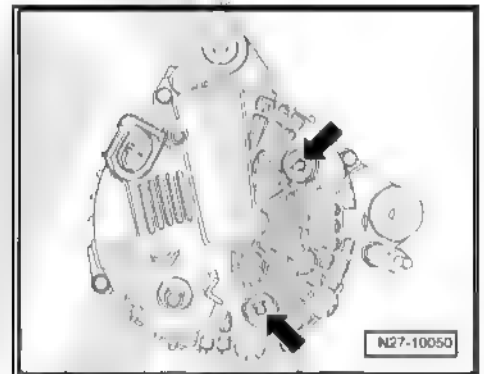
V.A.G 1783



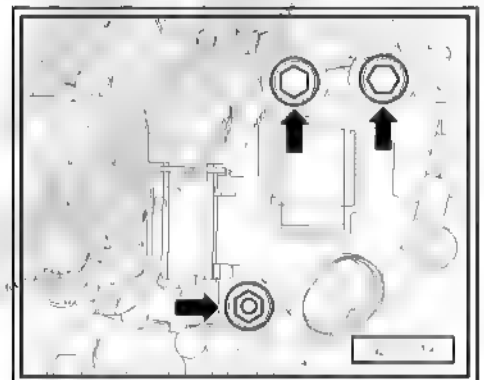
Q00-10085

3.11.1 Disassembly

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the Generator (Alternator) - C- ➤ [page 28](#) .
- Release the fastening nuts -arrows- and remove the protection cover.



- Loosen the fastening screws -arrows- (2 Nm) of the Voltage regulator - C1- .
- Remove the Voltage regulator - C1- .

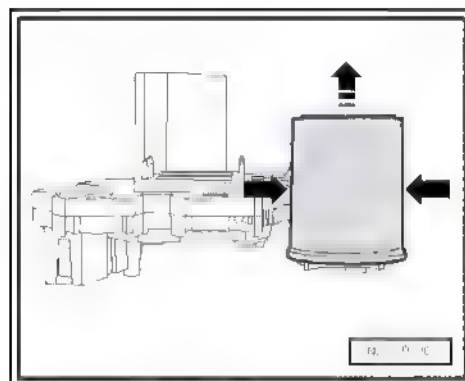


3.11.2 Assembly

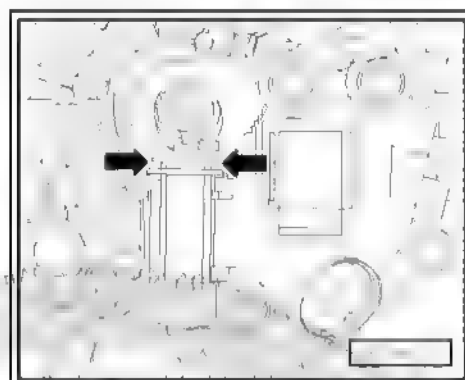
Assembly is performed in the reverse order to disassembly, observing the following:



- Release the locks -arrows- and remove the protection cover from the Voltage regulator - C1- .
- Insert the carbon brushes in the Voltage regulator - C1- case, and mount on the Generator (Alternator) - C- .
- Tighten the securing nuts and screws to the specified tightening torque → [page 56](#) .



- Push the protection cover into the guide rails -arrows- until fitting.



3.12 Tightening torques - Alternator

Location	Tightening torques	
Cable (B+) to alternator	M8	15 Nm
Cable support to alternator	M5	4.5 Nm
Alternator's voltage regulator (Bosch, Valeo)	M4	2 Nm
Protection cover to alternator (Bosch)	M5	4.5 Nm
Poly-V belt pulley with freewheel unit to alternator	M10	80 Nm
Tensioning element (BNM)	M8	25 Nm
Tensioning element (BMD, BKR, ASY)	M8	20 Nm + 90°
Return pulley (CCNA, CCRA)	M10	45 Nm
Poly-V belt pulley without freewheel unit to alternator	M10	65 Nm
Compensation reservoir	M6	10 Nm
Alternator to compact support for (BMD, BKR, ASY) engines	M8	25 Nm
Alternator to compact support for (BJE, BNX, BNM, BAH, BPA, CCNA, CCRA) engines	M8	23 Nm



90 – Gauges, instruments

1 Combined instrument

General description:

The Combined instrument - K- has the following components

- ◆ Control unit with indicator in the combined instrument - J285- .
- ◆ Immobilizer control unit - J362-
- ◆ Speedometer - G21- .
- ◆ Tachometer - G5- .
- ◆ Fuel level indicator - G1-
- ◆ Coolant temperature indicator - G3-
- ◆ Multi-function indicator.
- ◆ Control lamps ⇒ [page 65](#) .
- ◆ Control light symbols ⇒ [page 61](#) .



Note

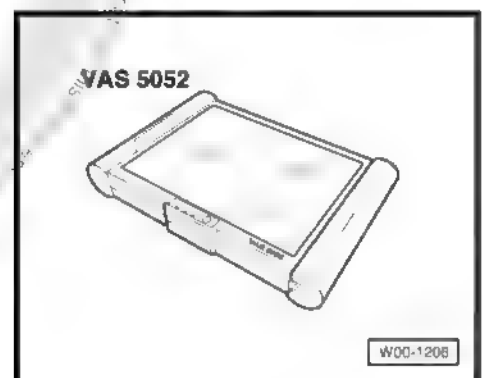
The Immobilizer control unit - J362- is inserted in the combined instrument for vehicles destined to the European market.

All the light displays are equipped with light-emitting diodes (LEDs) or incandescent lamps. Repair works are only expected for incandescent lamps. If necessary, replace the entire Combined instrument - K- ⇒ [page 58](#) .

1.1 Locating defects and indicating faults

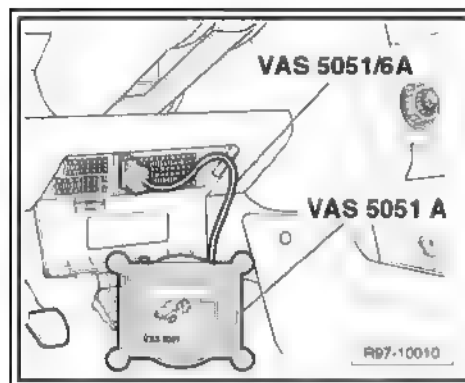
The Combined instrument - K- is equipped with self-diagnosis function.

For troubleshooting, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment.





- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment → General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .
- Turn on the ignition.
- Turn off all electrical devices
- Proceed by selecting the desired functions → Vehicle diagnostic tester.



1.2 Combined instrument - K- - replace



WARNING

When replacing the Combined instrument - K- , refer to the previous unit data with the "vehicle diagnostics laptop" before removal, and transfer them to the new Combined instrument - K- .

Before carrying out any work on the electric system, it is necessary to disconnect the battery - A- → [page 1](#) earth cable.



Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A- .*
- ◆ *Before removing the Combined instrument - K- , follow the notes and work instructions for troubleshooting.*
- ◆ *Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*



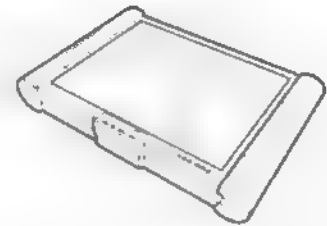
Special tools and workshop equipment required

- ◆ Vehicle diagnostic, testing and information system - VAS 5051-
- ◆ Vehicle diagnostic, testing and information system - VAS 5052-
- ◆ Vehicle diagnostic, testing and information system - VAS 6150-
- ◆ Diagnostic cable - VAS 5051/6B-
- ◆ Diagnostic cable - VAS 5052/3A-
- ◆ Wireless diagnostic connector - VAS 5054A-

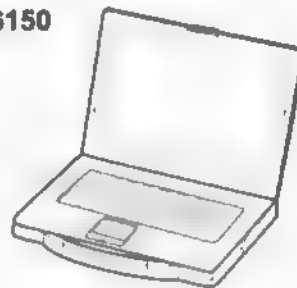
VAS 5051



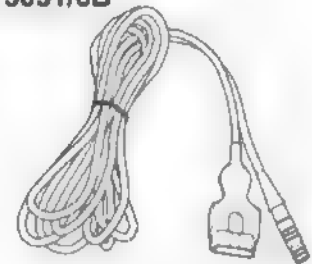
VAS 5052



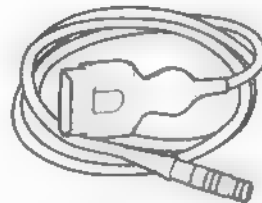
VAS 6150



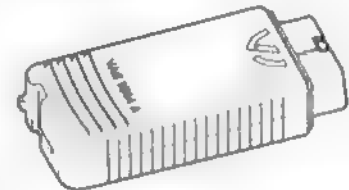
VAS 5051/6B



VAS 5052/3A



VAS 5054 A



Q97-10001

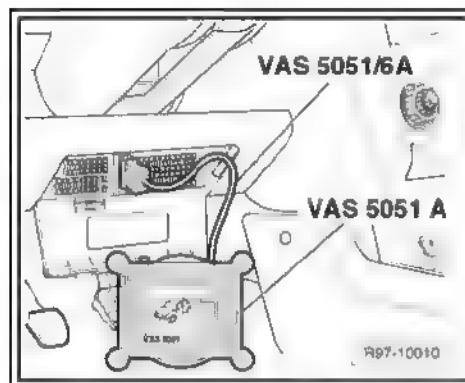
The work sequence "Combined instrument - replace" includes the following works:

- ◆ When installing a new Combined instrument - K-, it is necessary to adjust the Control unit w/ indicator on the combined instrument - J285- to the different equipment features and corresponding country-related variations.
- ◆ To adapt the Immobilizer control unit - J362- to the Engine control unit - J623-, save the Engine control unit - J623- data in the replacement Combined instrument - K-.
- ◆ After installing a new Combined instrument - K-, it is necessary to adapt all keys of the vehicle.

To adapt, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment



- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment → General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .
- Turn on the ignition.
- Turn off all electrical devices
- Proceed by selecting the desired functions → Vehicle diagnostic tester.



1.3 Combined instrument - K- - remove and install



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ⇒ [page 1](#) .



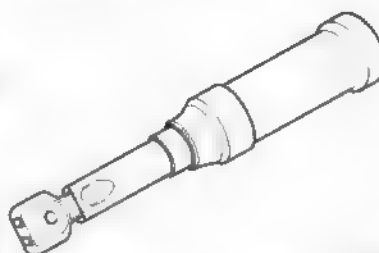
Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A- .
- ◆ Before removing the Combined instrument - K- , follow the notes and work instructions for troubleshooting ⇒ [page 58](#) .
- ◆ Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

V.A.G 1783



Q00-10085

1.3.1 Removal

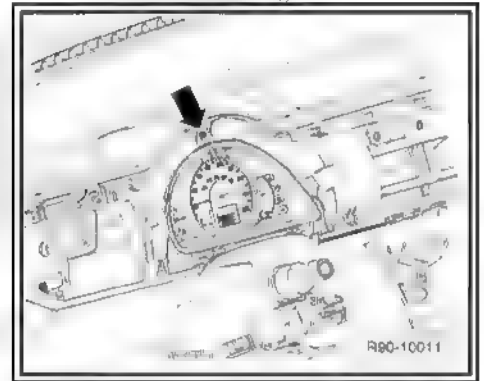


Note

It is not necessary to remove the steering wheel. The steering wheel is not shown in order to provide a clearer view.



- Position the steering wheel with adjustment device totally outwards, and lock it to the lowest position (vehicle with steering position adjustment).
- Remove left air vent ⇒ Heating, air conditioning; Rep. gr. 80 ; Heating .
- Remove the centre frame of the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Remove the central air vent set and panel's frame ⇒ General body repairs, interior; Rep. gr. 70 ; Lining/insulation .
- Loosen the fastening screw -arrow- (1,5 Nm) of the Combined instrument - K- .
- Carefully disengage the Combined instrument - K- and disconnect its connector.
- Remove the Combined instrument - K- .



1.3.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten fastening screw on the Combined instrument - K- to the specified torque ⇒ [page 66](#) .
- After installing, check the Combined instrument - K- functions and make the adaptations ⇒ [page 58](#) .

1.4 Combined instrument - K- connector pinout

The combined instrument's - K- 32-pole connector (blue) pinout is described in the electrical diagrams ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

1.5 Combined instrument - K- - control light symbols

1.5.1 Version (LAM) 07/07 ►



1 - Rear window heating control light - K10-

2 - Position light

3 - Left turn indicators control light - K65-

4 - Fuel reserve control light - K16-

5 - Coolant temperature control light - K43-

6 - Alternator control light - K2-

7 - High beam control light - K1-

8 - Brake system control light - K118-

9 - Oil pressure control light - K3-

10 - Right turn indicators control light - K94-

11 - Immobilizer control light - K117-

12 - "E-gas" system failure indicator light - K132-

☐ Petrol engine vehicles only.

13 - Airbag control lamp - K75-

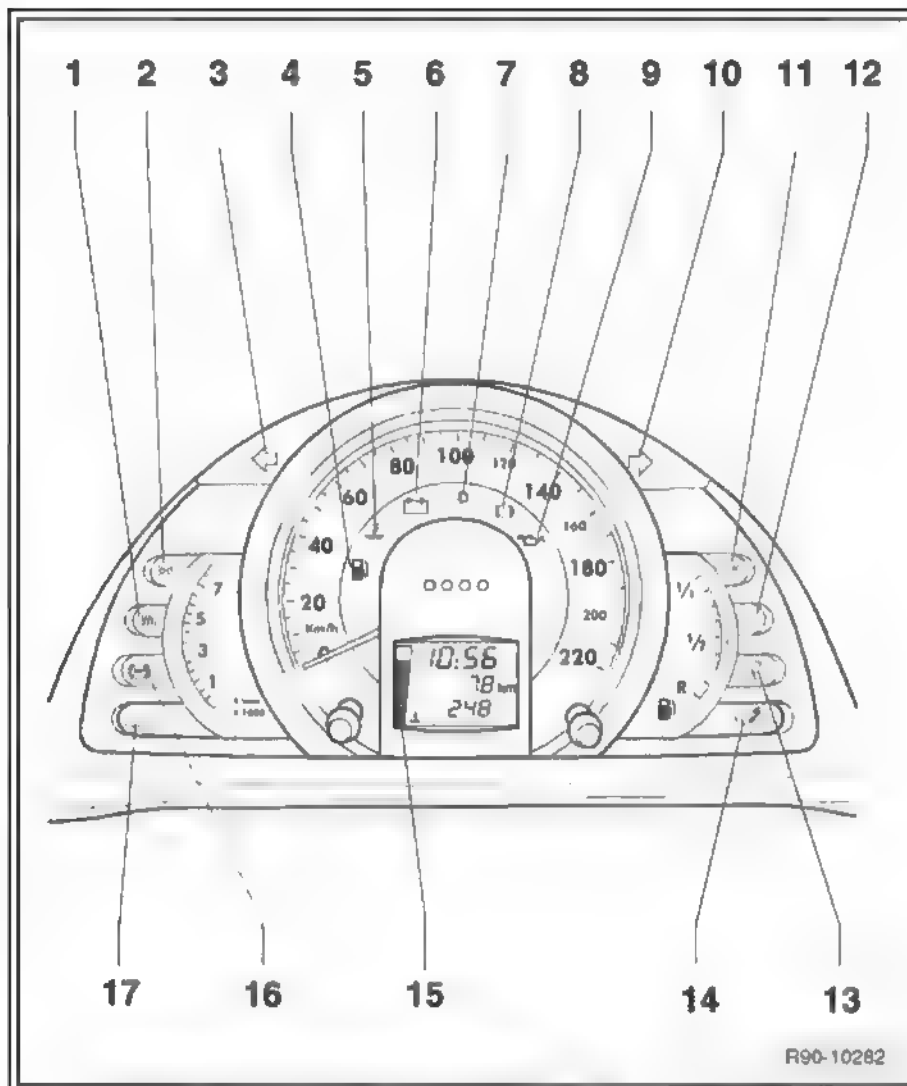
14 - Warning light - exhaust gases - K83-

☐ On-Board Diagnosis (OBD).

15 - Engine temperature display

16 - ABS control light - K47-

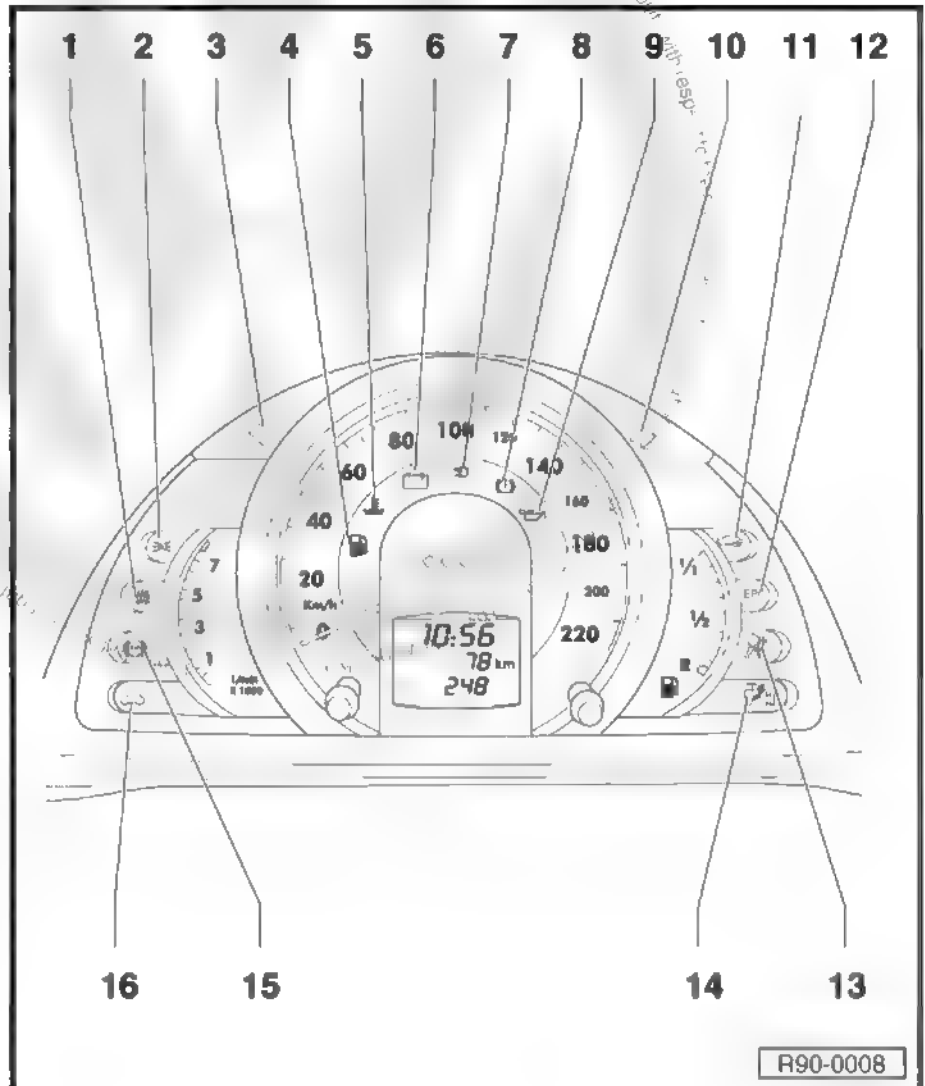
17 - Not used





1.5.2 Version (LAM) > 07/07

- 1 - Rear window heating control light - K10-
- 2 - Position light
- 3 - Left turn indicators control light - K65-
- 4 - Fuel reserve control light - K16-
- 5 - Coolant temperature control light - K43-
- 6 - Alternator control light - K2-
- 7 - High beam control light - K1-
- 8 - Brake system control light - K118-
- 9 - Oil pressure control light - K3-
- 10 - Right turn indicators control light - K94-
- 11 - Immobilizer control light - K117-
- 12 - "E-gas" system failure indicator light - K132-
 - ☐ Petrol engine vehicles only.
- 13 - Airbag control lamp - K75-
- 14 - Warning light - exhaust gases - K83-
 - ☐ On-Board Diagnosis (OBD).
- 15 - ABS control light - K47-
- 16 - Not used





1.5.3 Version (EU)

1 - Rear window heating control light - K10-

2 - Electromechanical servo brake control light - K161-

3 - Left turn indicators control light - K65-

4 - Fuel reserve control light - K16-

5 - Coolant temperature control light - K43-

6 - Alternator control light - K2-

7 - High beam control light - K1-

8 - Brake system control light - K118-

9 - Oil pressure control light - K3-

10 - Seat belt warning system control light - K19-

11 - Right turn indicators control light - K94-

12 - Immobilizer control light - K117-

13 - "E-gas" system failure indicator light - K132-

14 - Airbag control lamp - K75-

15 - Warning light - exhaust gases - K83-

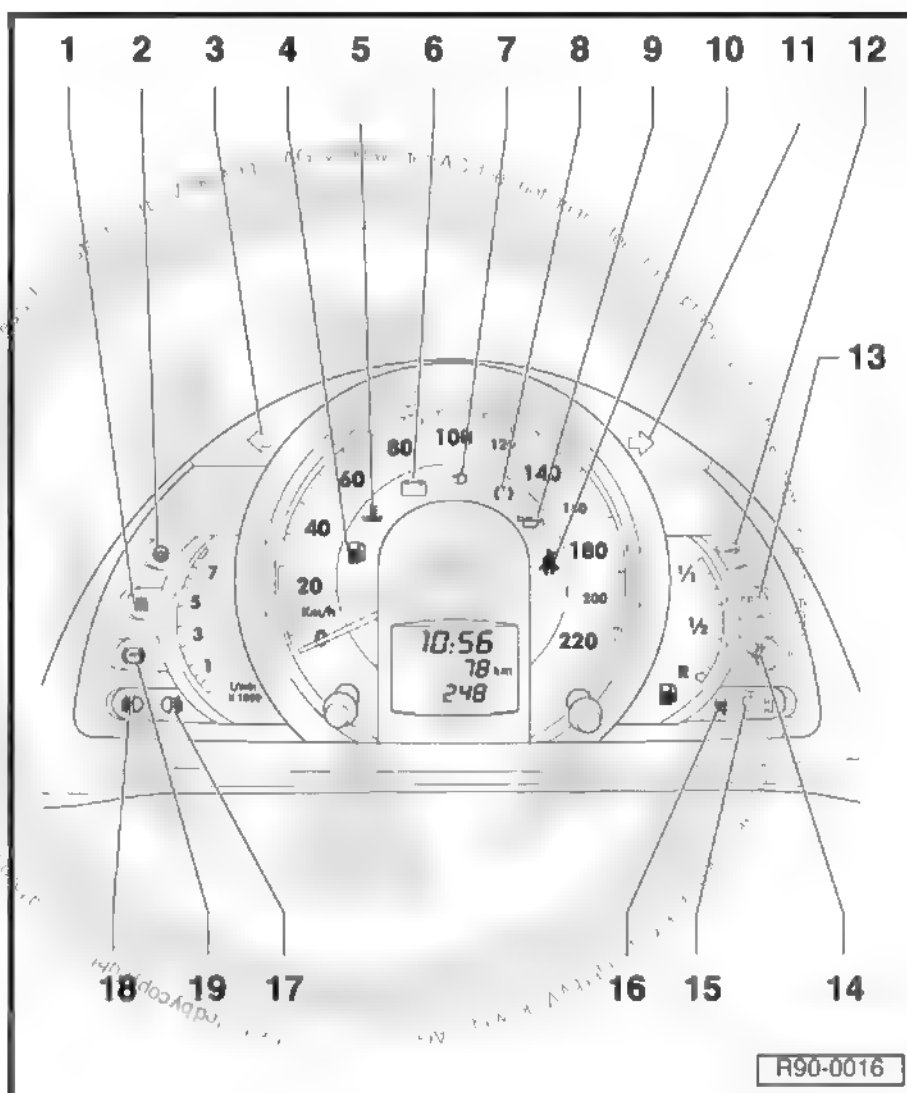
□ On-Board Diagnosis (OBD).

16 - ASR and ESP control light - K155-

17 - Tail fog light control lamp - K13-

18 - Fog light control lamp - K17-

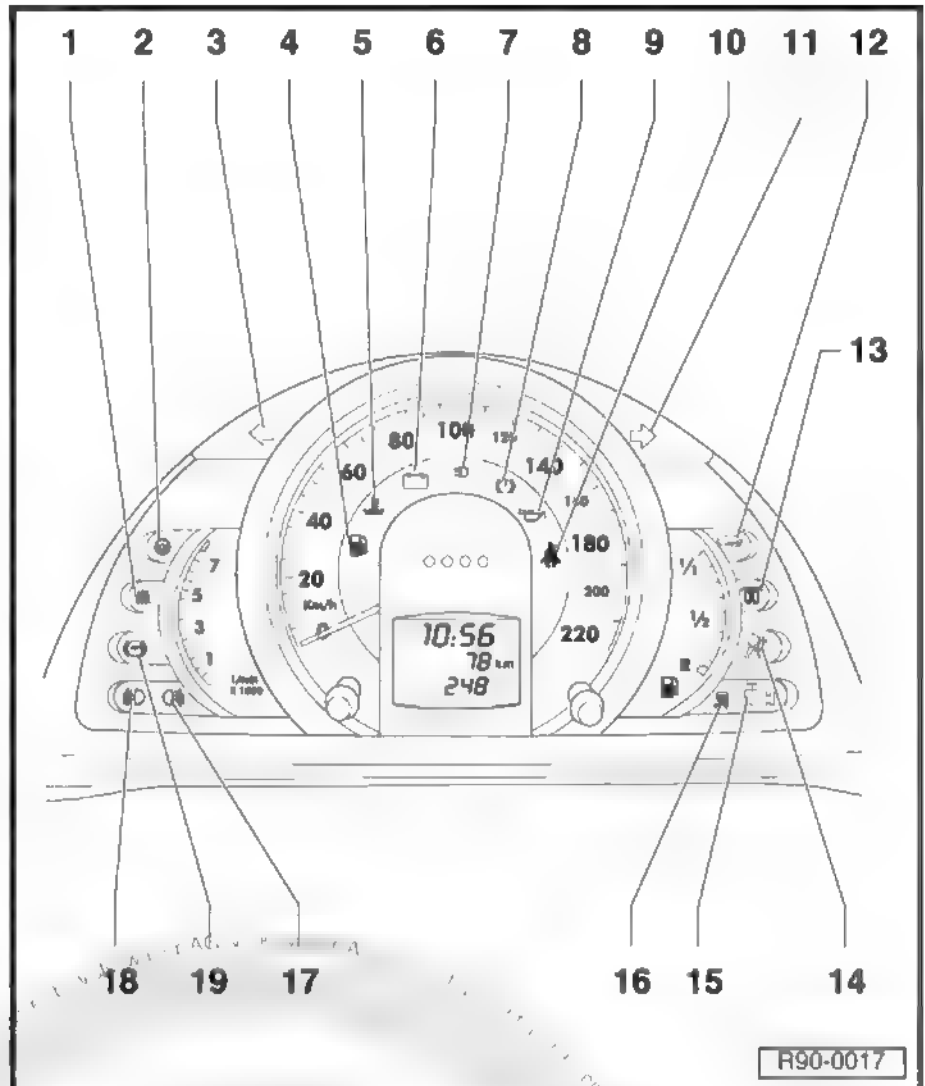
19 - ABS control light - K47-





1.5.4 Version (Diesel)

- 1 - Rear window heating control light - K10-
- 2 - Electromechanical servo brake control light - K161-
- 3 - Left turn indicators control light - K65-
- 4 - Fuel reserve control light - K16-
- 5 - Coolant temperature control light - K43-
- 6 - Alternator control light - K2-
- 7 - High beam control light - K1-
- 8 - Brake system control light - K118-
- 9 - Oil pressure control light - K3-
- 10 - Seat belt warning system control light - K19-
- 11 - Right turn indicators control light - K94-
- 12 - Immobilizer control light - K117-
- 13 - Glow time control light - K29-
 - ☐ Pre-heating (Diesel vehicles).
- 14 - Airbag control lamp - K75-
- 15 - Warning light - exhaust gases - K83-
 - ☐ On-Board Diagnosis (OBD).
- 16 - ASR and ESP control light - K155-
- 17 - Tail fog light control lamp - K13-
- 18 - Fog light control lamp - K17-
- 19 - ABS control light - K47-



1.6 Combined instrument - K- - replace control light lamps

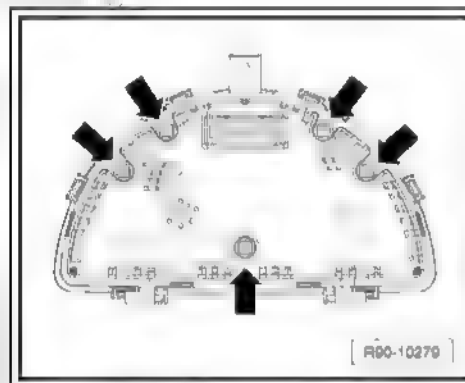
All control lights on the Combined instrument - K- , are comprised by LEDs or incandescent lamps.



Note

In accordance with the vehicle configuration, some combined instruments have incandescent lamps (only these can be repaired); otherwise, the entire combined instrument - K- must be replaced ➔ [page 58](#).

- Remove the Combined instrument - K- ➔ [page 60](#).
- Remove the sockets with the lights-arrows- by turning them.



1.7 Tightening torque - Combined instrument

Location	Tightening torques
Fastening of combined instrument	1.5 Nm



2 Indication of Service Interval

The electronic system for the service interval indicator interprets the data from a time counter and two distance counters, and informs the user after a given time interval has elapsed or a given distance has been travelled

2.1 Service interval indication - reset to zero

Please Refer to Manual ⇒ Maintenance ; Booklet 22.1 .



92 – Windscreen wash/wipe system

1 Windscreen wiper system



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



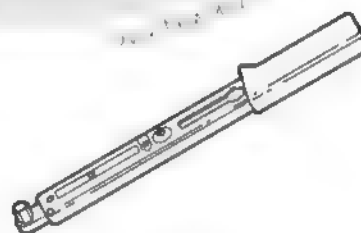
Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331

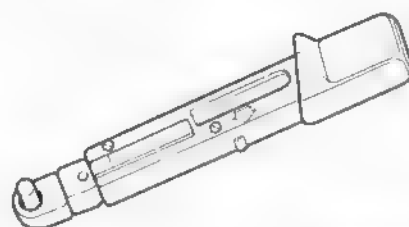
V.A.G 1331



Q00-10065

- ◆ Torque wrench - 40 to 20 Nm (enc. 3/8") - VAG 1410

V.A.G 1410



Q00-10066

1.1 Windscreen wiper system - assembly overview

For vehicles with left-hand steering wheel:



1 - Windscreen wiper blade

- ☐ Remove and install
➔ [page 70](#) .
- ☐ Adjust the application
angle ➔ [page 78](#) .

2 - Windscreen wiper arm

- ☐ Remove and install
➔ [page 71](#) .
- ☐ Adjust the resting posi-
tion ➔ [page 77](#) .

3 - Protection covers

4 - Hexagonal nut

- ☐ 17 ± 1.5 Nm.

5 - Screws

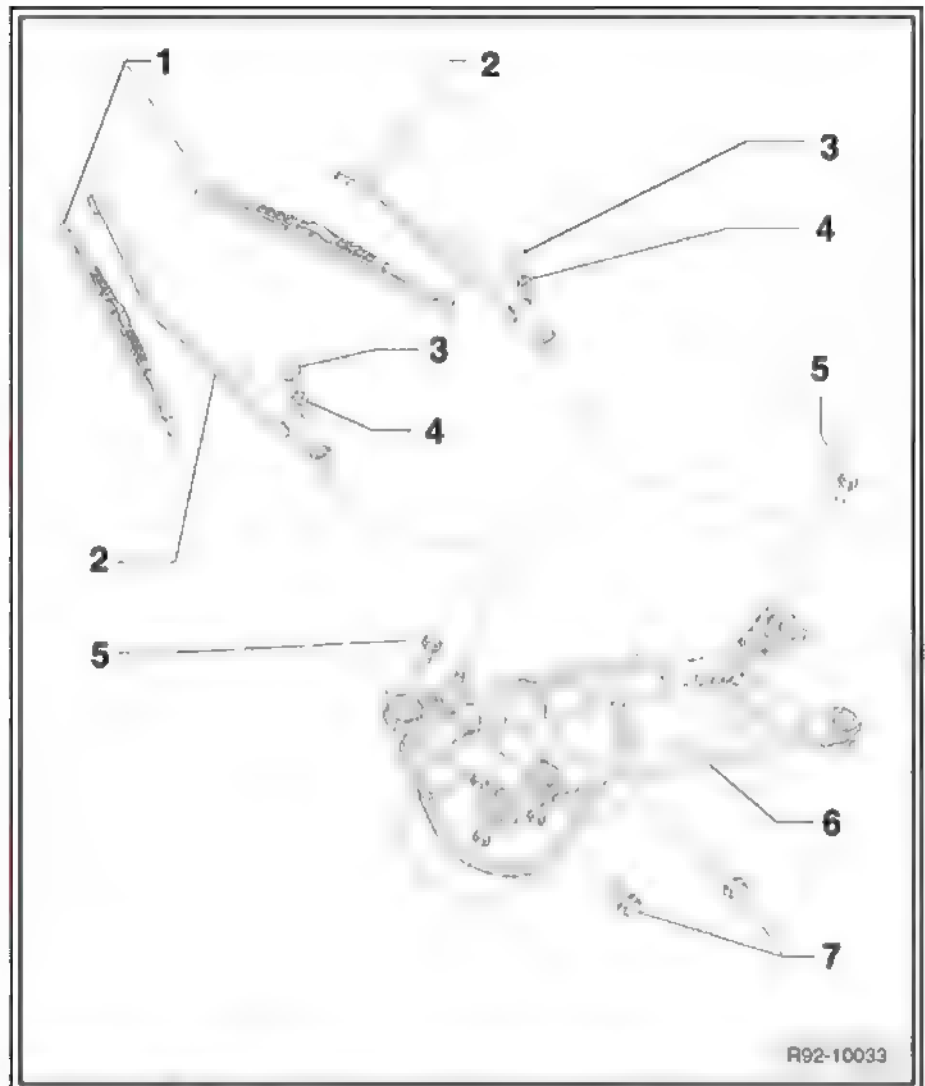
- ☐ 5 ± 0.5 Nm.

**6 - Windscreen wiper mecha-
nism**

- ☐ Remove and install
➔ [page 72](#) .

7 - Screws

- ☐ 5 ± 0.5 Nm.



For vehicles with right-hand steering wheel:



1 - Windscreen wiper blade

- ☐ Remove and install
➔ [page 70](#) .
- ☐ Adjust the application
angle ➔ [page 78](#)

2 - Windscreen wiper arm

- ☐ Remove and install
➔ [page 71](#) .
- ☐ Adjust the resting posi-
tion ➔ [page 77](#) .

3 - Protection covers

4 - Hexagonal nut

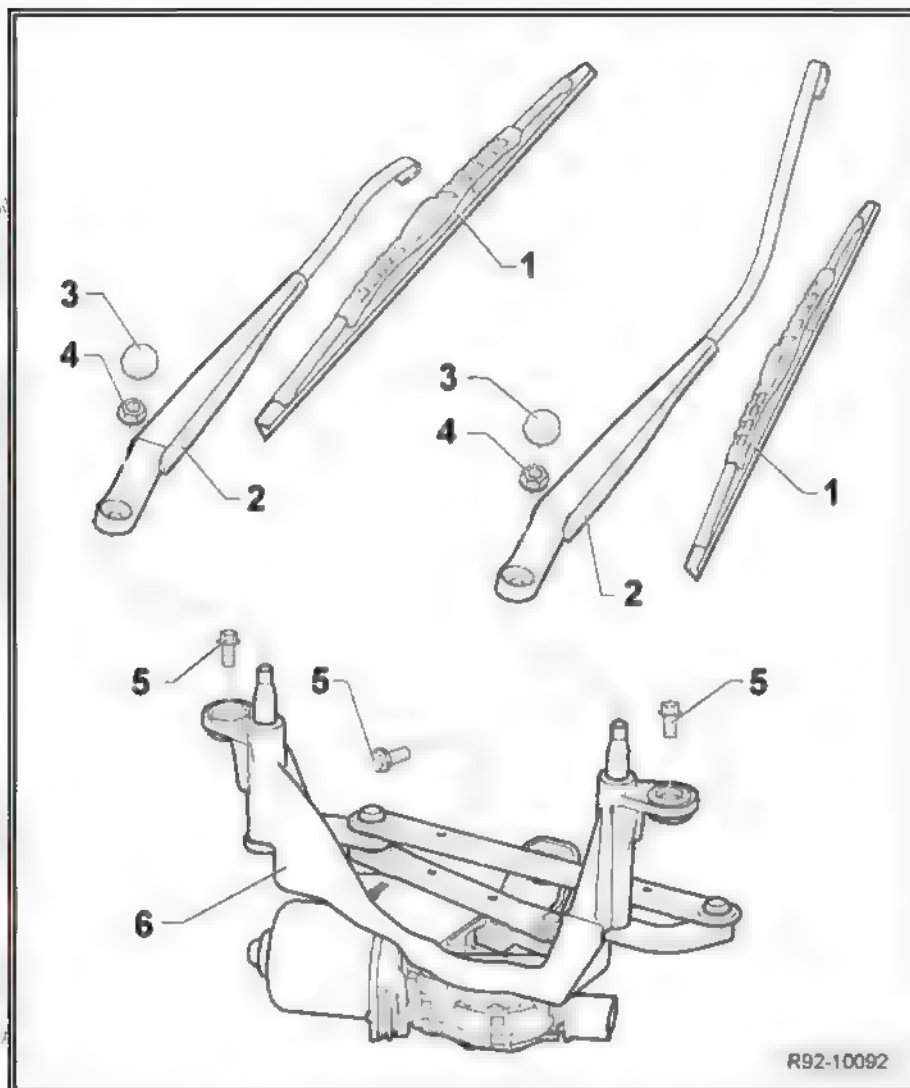
- ☐ 17 ± 1.5 Nm.

5 - Screw

- ☐ 5 ± 0.5 Nm.

6 - Windscreen wiper mechanism

- ☐ Remove and install
➔ [page 72](#) .



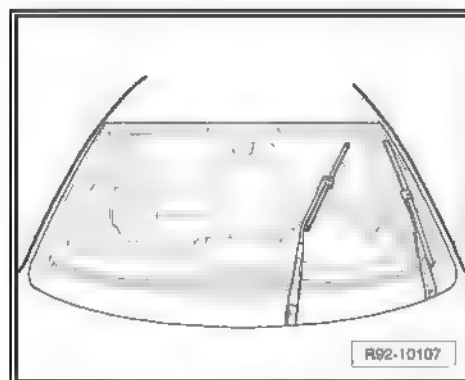
1.2 Windscreen wiper blade - remove and install

1.2.1 Removal

- Place arms in "service/winter position".

The "service/winter position" is activated when the windscreen wiper lever is activated in "timer operation" position within 10 seconds after turning the ignition off ➔ Vehicle instruction manual .

For vehicles with left-hand steering wheel:

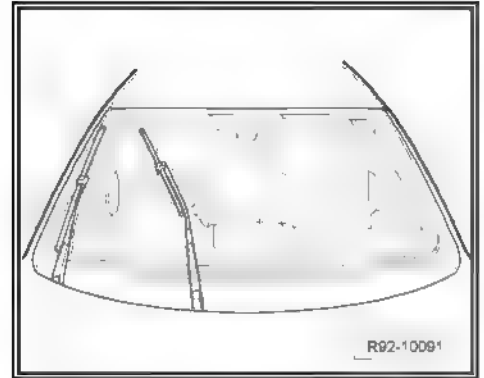




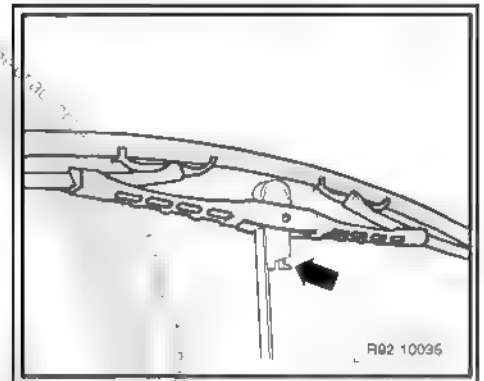
For vehicles with right-hand steering wheel:

Continued for all vehicles:

- Raise the windscreen wiper arm.



- Press the blade lock -arrow- and pull it down towards the windscreen wiper arm.
- Release the blade from the windscreen wiper arm, and remove it.



1.2.2 Installation

Installation is performed in reverse sequence to the removal.

1.3 Windscreen wiper blade and arm set - remove and install

1.3.1 Removal

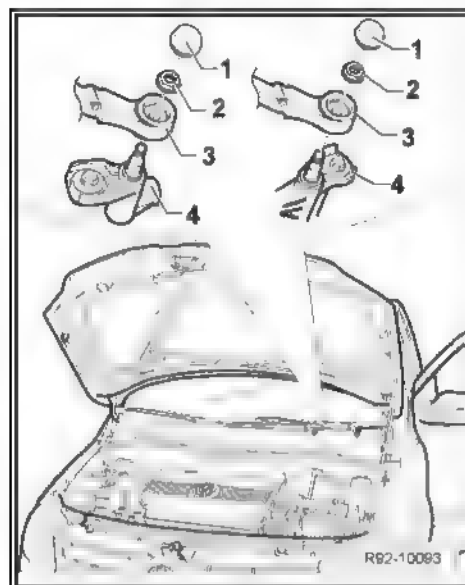


Note

- ◆ *Before removing the windscreen wiper arms, please check if the windscreen wiper motor - V- is in the rest position. This is the only way possible to adjust the correct wiper arm resting position during the installation.*
- ◆ *For vehicles with right-hand steering wheel, the windscreen wiper blades are arranged symmetrically.*
- Remove the protection covers carefully -1- with a screwdriver.



- Loosen hexagonal nuts -2- (17 Nm), but do not remove them completely.
- Move carefully the windscreen wiper arms -3- until releasing them from the windscreen wiper mechanism -4-.
- Remove the hexagonal nuts -2- and remove the windscreen wiper arms -3-.



1.3.2 Installation

- Fit the windscreen wiper arms near its resting positions and tighten slightly the fastening nuts.
- Adjust the blades' resting position [⇒ page 77](#).
- Tighten the fastening nuts to the specified torque [⇒ page 79](#).



Note

Tightening of the fastening nuts should be done with double torque: apply the specified torque, loosen a half-turn, and apply the torque again.

- Install the protection covers.
- ◆ Vehicles with left-hand steering wheel [⇒ Item 3 \(page 69\)](#).
- ◆ Vehicles with right-hand steering wheel [⇒ Item 3 \(page 70\)](#).

1.4 Windscreen wiper mechanism - remove and install

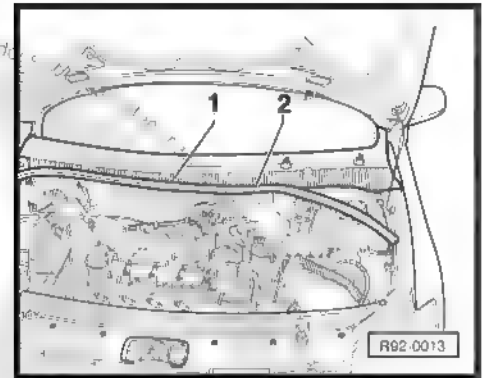
1.4.1 For vehicles with left-hand steering wheel

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - [A](#) [⇒ page 1](#).
- Remove the windscreen wiper arm and blade set [⇒ page 71](#).



- Remove seal packing -2- and the windscreen lower covering -1- ➤ General body repairs, exterior; Rep. gr. 66 ; External equipment .

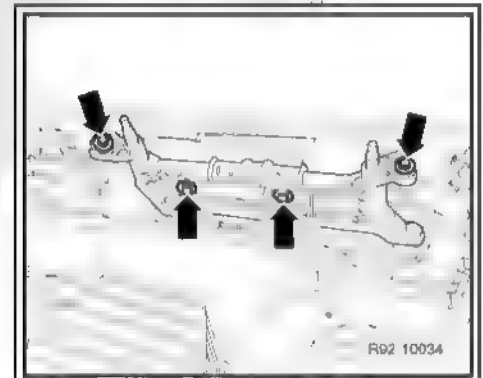


- Loosen the fastening screws -arrows- (5 Nm) from the windscreen wiper mechanism assembly.
- Disengage the Windscreen wiper motor - V- connector.
- Remove the windscreen wiper mechanism assembly from its housing.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

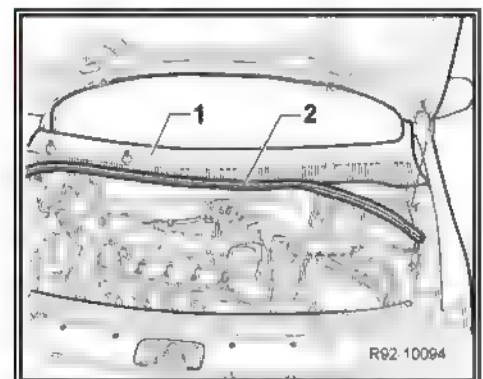
- Tighten the fastening nuts and screws to the specified tightening torque ➤ [page 79](#) .



1.4.2 For vehicles with right-hand steering wheel

Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➤ [page 1](#) .
- Remove the windscreen wiper arm and blade set ➤ [page 71](#) .
- Remove seal packing -2- and the windscreen lower covering -1- ➤ General body repairs, exterior; Rep. gr. 66 ; External equipment .





- Loosen the fastening screws -2- (5 Nm) from the windscreen wiper mechanism assembly -1-.
- Disengage the Windscreen wiper motor - V- connector.
- Remove the windscreen wiper mechanism assembly -1- from its housing.

Installation:

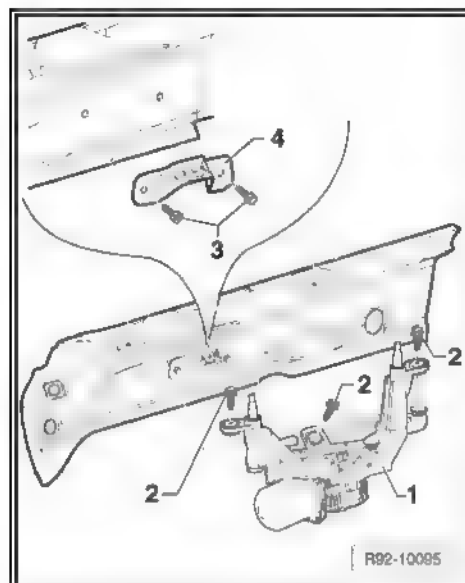
Installation is performed in reverse sequence to the removal, considering the following.

- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 79](#) .



Note

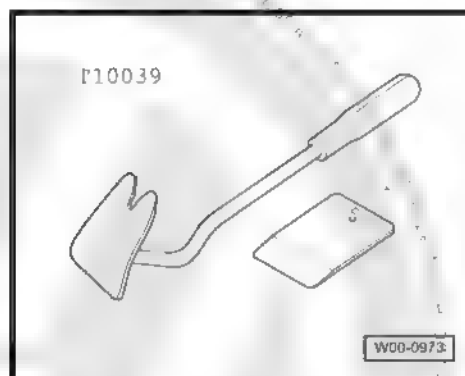
If it is necessary to remove the fastening support -4- from the windscreen wiper mechanism -1- during installation, tighten fastening screws -3- to a torque of 5 ± 0.5 Nm).



1.5 Windscreen wiper motor - V- - disassemble and assemble

Special tools and workshop equipment required

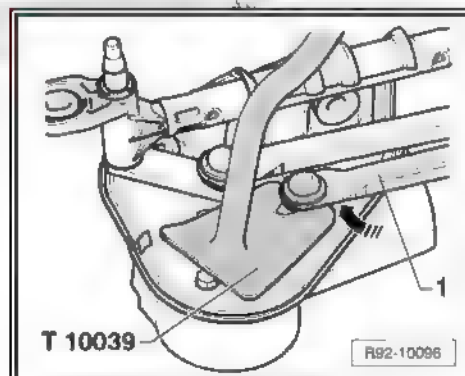
- ◆ Lever - T 10039-



1.5.1 For vehicles with left-hand steering wheel

Disassembly:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the windscreen wiper arm and blade set ⇒ [page 71](#) .
- Remove the windscreen wiper mechanism ⇒ [page 72](#) .
- Disengage the drive stem -1- towards -arrow- from shaft, by using the Lever - T 10039- .





- Loosen the fastening nut -1- (18 Nm) and remove support -2- from the Windscreen wiper motor - V- shaft.
- Loosen the screws -arrows- (9 Nm) that fasten the motor to the windscreen wiper mechanism assembly.
- Remove the Windscreen wiper motor - V- from its housing.

Assembly:

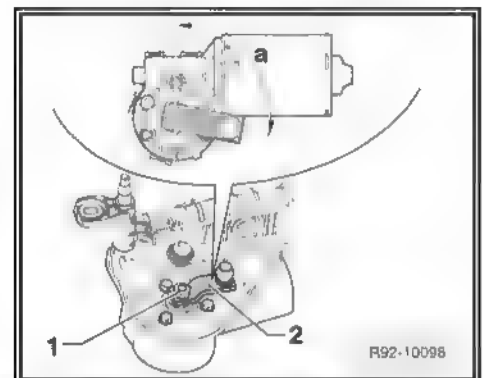
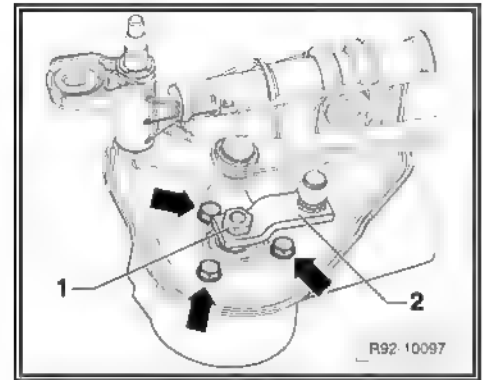
Assembly is performed in the reverse order to disassembly, observing the following:



Note

Set the windscreen wiper motor - V- in its rest position.

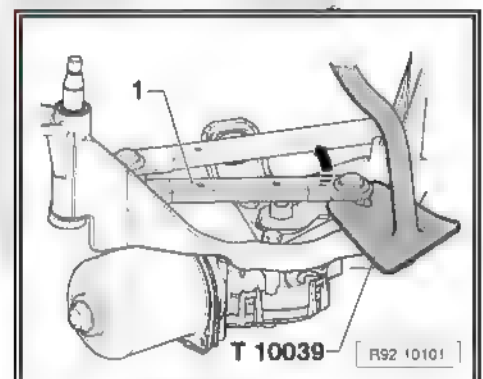
- Position the Windscreen wiper motor - V- on the windscreen wiper mechanism assembly, and tighten the fastening screws to the specified torque [⇒ page 79](#).
- Install the shaft support -2- so that measure -a- is $100^{\circ}44' \pm 5^{\circ}$ and tighten the fastening nut -1- to the specified torque [⇒ page 79](#).



1.5.2 For vehicles with right-hand steering wheel

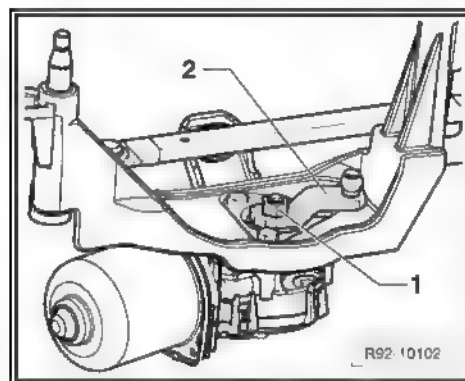
Disassembly:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the windscreen wiper arm and blade set [⇒ page 71](#).
- Remove the windscreen wiper mechanism [⇒ page 73](#).
- Disengage the drive stem -1- towards -arrow- from shaft, by using the Lever - T 10039-.





- Loosen the fastening nut -1- (18 Nm) and remove support -2- from the Windscreen wiper motor - V- shaft.



- Loosen the screws -arrows- (7 Nm) that fasten the motor to the windscreen wiper mechanism assembly.
- Remove the Windscreen wiper motor - V- -1- from its housing.

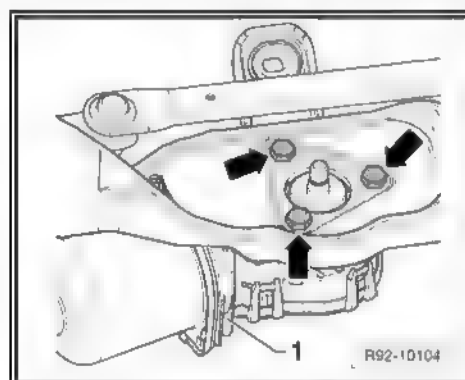
Assembly:

Assembly is performed in the reverse order to disassembly, observing the following:

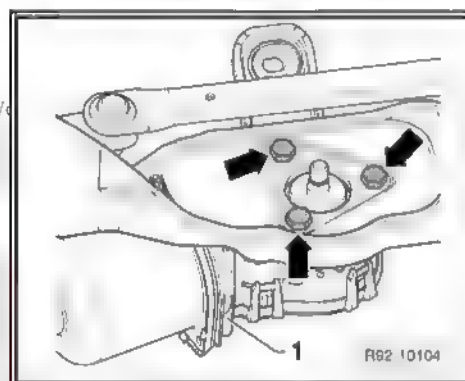


Note

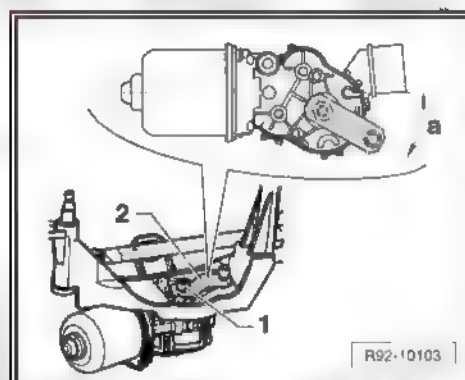
Set the windscreen wiper motor - V- in its rest position.



- Position the Windscreen wiper motor - V- -1- on the windscreen wiper mechanism assembly, and tighten the fastening screws -arrows- to the specified torque ⇒ [page 79](#).



- Install the shaft support -2- so that measure -a- is $29^\circ \pm 3^\circ$ and tighten the fastening nut -1- to the specified torque ⇒ [page 79](#).





1.6 Windscreen wiper blade resting position - adjust

1.6.1 Vehicles (LAM)



WARNING

The edge of the right blade should be positioned between the windscreen's first and third serigraphy trace.

The measurement -a- between the edge of the right windscreen wiper blade and the water reflector should be 55 ± 5 mm.

The measurement -b- between the aligned edges of the windscreen wiper blades and the water reflector should be 27 mm.

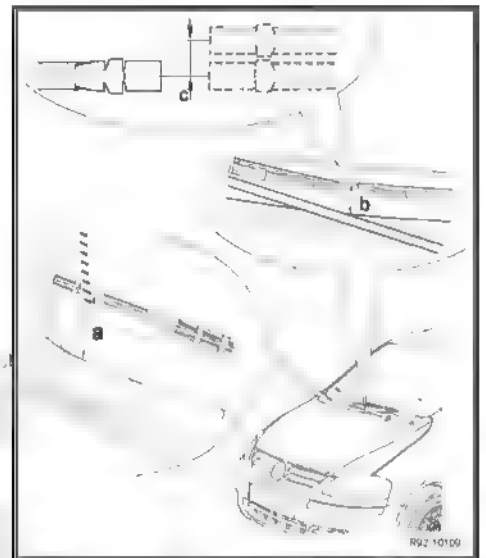
The measurement -c- between the aligned edges of the windscreen wiper blades should be 0 to 8 mm.



WARNING

The left windscreen wiper blade should be aligned or be slightly above the right windscreen wiper blade, otherwise it can cause the blades to collide with each other.

- If necessary, adjust the windscreen wiper blade resting position by releasing and moving the wiper arm/blade assembly.
- Remove the windscreen wiper arm/blade assembly
⇒ [page 71](#).



1.6.2 Vehicles (Europe)



Note

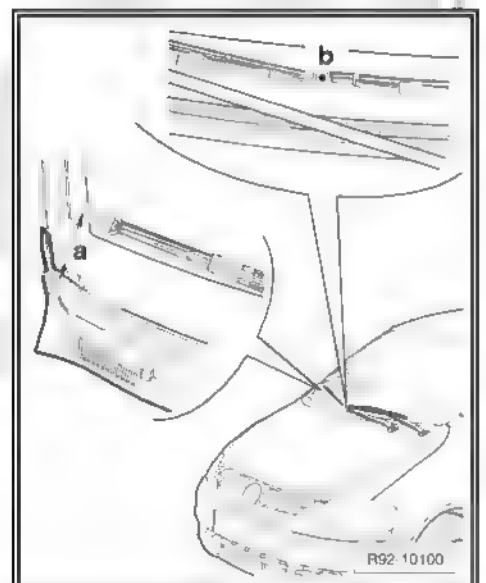
For vehicles with right-hand steering wheel, the windscreen wiper blades are arranged symmetrically.

The distance -a- between the windscreen blade end and the upper edge on windscreen lower covering must be 50 ± 5 mm.

The windscreen wiper edges must be aligned -b-.

Assembly reference: windscreen serigraphy trace.

- If necessary, adjust the windscreen wiper blade resting position by releasing and moving the wiper arm/blade assembly.
- Remove the windscreen wiper arm/blade assembly
⇒ [page 71](#).





1.7 Blade application angle on windscreen - adjust

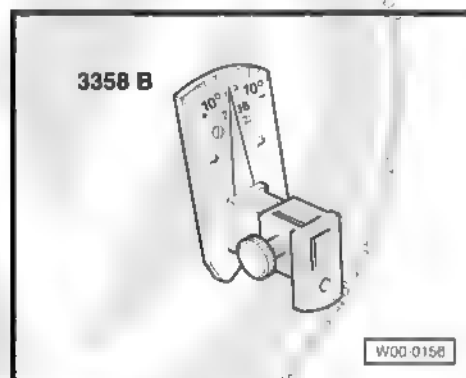


WARNING

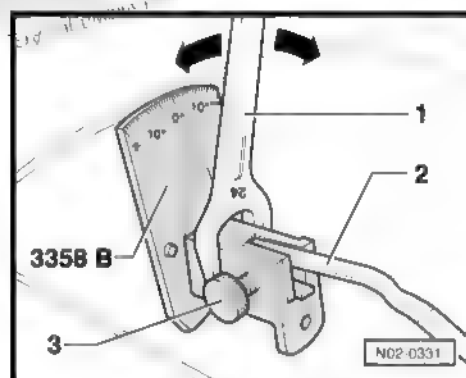
Only check the blade application angle when the wipers vibrate or make noises.

Special tools and workshop equipment required

- ◆ Adjustment device - 3358B-



- Adjust the resting position of the windscreen wiper arms
⇒ [page 77](#) .
- Remove the blades from the windscreen wiper arms
⇒ [page 70](#) .
- Place the windscreen wiper arm-2- on the Adjustment device - 3358B- and fasten it with the screw -3-.
- Check the application angle according to the following table:

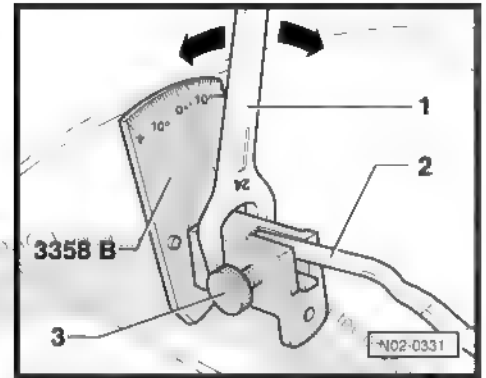


Application angle (nominal values)		
	Vehicles with left-hand steering wheel	Vehicles with right-hand steering wheel
Driver's side	-5,0°	+5,0°
Passenger's side	-5,0°	+5,0°
Tolerance	±2°	±2°

- If necessary, adjust the application angle to the nominal value as explained below:
- Using a SW24 spanner -1-, tilt the windscreen wiper arm -2- according to the nominal value -arrows-.



- Release the windscreen wiper arm -2- from the Adjustment device - 3358B- and fasten it again with the screw -3-.
- Compare the adjusted value with that given in the table. If necessary, repeat the operation until you reach the nominal value
- Remove the Adjustment device - 3358B- and install the windscreen wiper blade ➔ [page 70](#) .
- After adjusting, check the windscreen wiper operation for occasional trembling movements.



1.8 Tightening torques - Windscreen wiper system

Location	Tightening torques
Windscreen wiper arm and blade set	$17 \pm 1.5 \text{ Nm}$
Windscreen wiper mechanism to body	$5 \pm 0.5 \text{ Nm}$
Support to windscreen wiper motor shaft	$18 \pm 2 \text{ Nm}$
Motor to mechanism assembly (left-hand steering wheel)	$9 - 1 \text{ Nm}$
Motor to mechanism assembly (right-hand steering wheel)	$7 + 2 \text{ Nm}$
Fastening support to body	$5 \pm 0.5 \text{ Nm}$



2 Windscreen washer system



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

2.1 Windscreen washer system - assembly overview

1 - Spray nozzles

- ☐ Replace → [page 82](#).
- ☐ Adjust → [page 83](#).

2 - Windscreen washer pump connector Rear window washer pump - V5- and/or Rear window washer pump - V13-

3 - Windscreen washer pump - V5- and/or Rear window washer pump - V13-

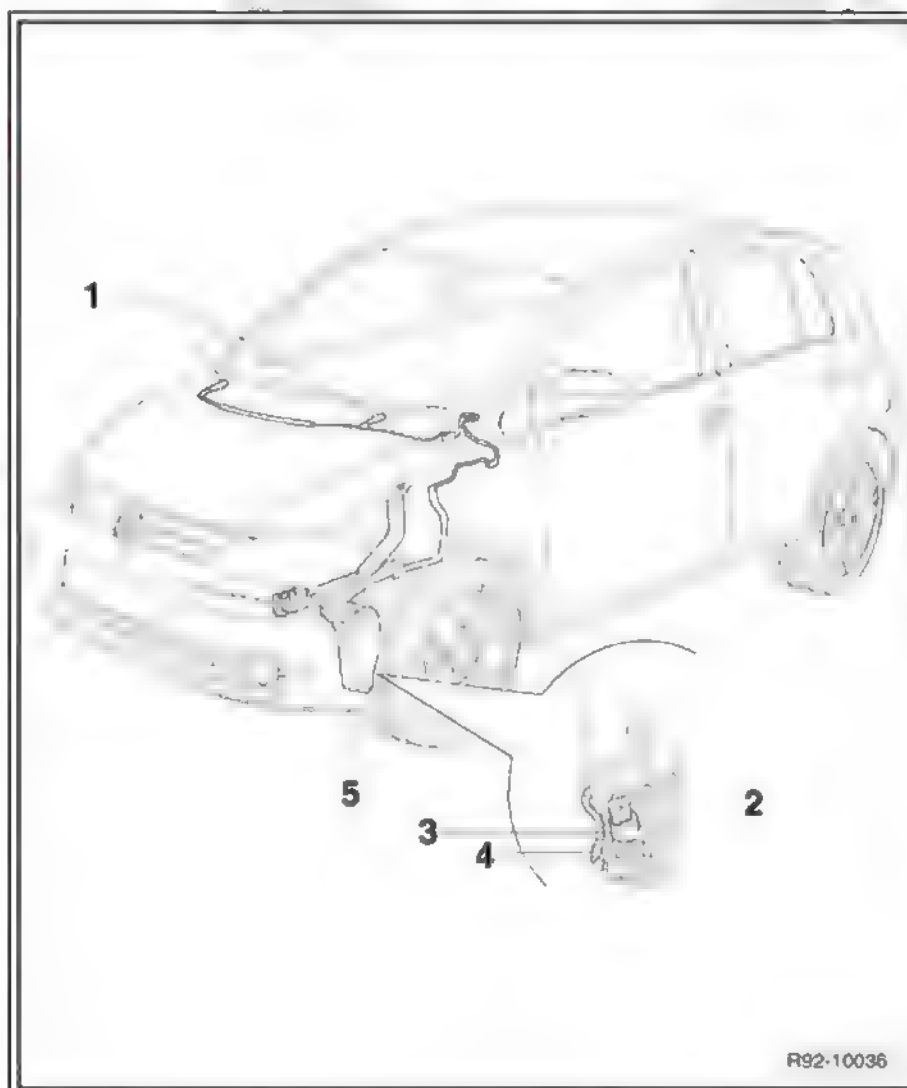
- ☐ Remove and install → [page 82](#).

4 - Front washer pipe

- ☐ Connections → General information; Rep. gr. 92 ; Windscreen, rear window and headlight washer and wiper.
- ☐ Repair → General information; Rep. gr. 92 ; Windscreen, rear window and headlight washer and wiper.

5 - Reservoir for the windscreen washer system

- ☐ Remove and install



R92-10036

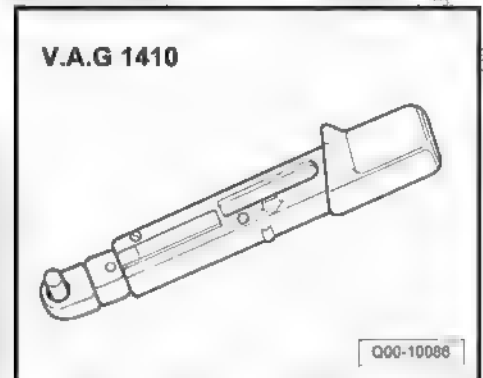


➤ [page 81](#) .

2.2 Reservoir for the windscreen washer system - remove and install

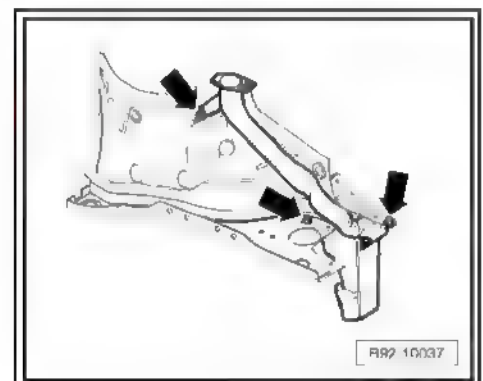
Special tools and workshop equipment required.

- ◆ Torque wrench - 40 to 20 Nm (enc. 3/8") - VAG 1410-



2.2.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➤ [page 1](#) .
- Put the vehicle on a lift in order to make the operation easier.
- Remove the left and right front wheel housing protector ➤ Body; Rep. gr. 66 ; Front wheel housing protector - remove and install .
- Remove front bumper ➤ General body repairs, exterior; Rep. gr. 63 ; Bumpers .
- Remove main headlight (left side) ➤ [page 95](#) .
- Disengage the Windscreen washer pump - V5- and/or Rear window washer pump - V13- connectors ➤ [page 82](#) .
- Drain the reservoir liquid.
- Remove the fastening nuts -arrows- (5 Nm) of reservoir.
- Remove the reservoir from the bottom of vehicle.



2.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the reservoir fastening nuts to the specified torque ➤ [page 84](#) .



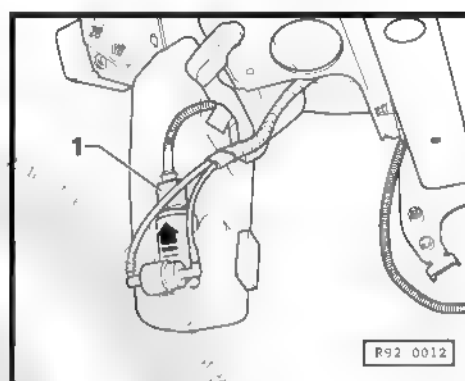
Note

When replenishing the reservoir. If fluid is used, refer to the mixture ratio in ➔ Maintenance ; Booklet 22.1 .

2.3 Windscreen washer pump - V5- and/or Rear window washer pump - V13- - remove and install

2.3.1 Removal

- Remove the left front wheel arch cover ➔ General body repairs, exterior; Rep. gr. 66 ; Exterior equipment .
- Disconnect the connector -1- and hose connections in the pump.
- Remove the pump from the reservoir, moving it towards -arrow-.



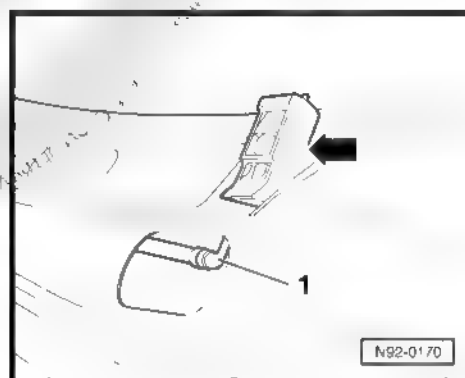
2.3.2 Installation

Installation is performed in reverse sequence to the removal.

2.4 Windscreen washer system spray nozzles - replace

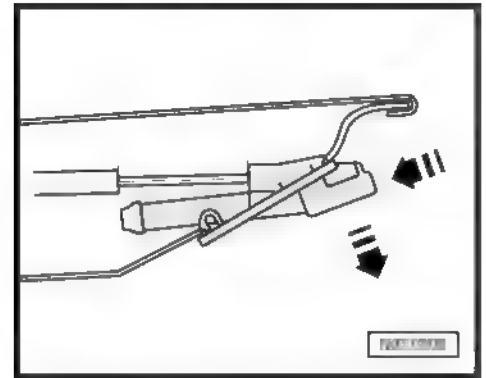
2.4.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Loosen the hose connection from the spray nozzle -1-. If necessary, disconnect the 2-pole connector from the heated spray nozzle (installed in some vehicles).





- Press the spray nozzle towards -arrow- and remove it downwards.



2.4.2 Installation

Installation is performed in reverse sequence to the removal.



Note

After installing, use the adjustment procedures for the washer jets
⇒ [page 83](#).

2.5 Windscreen washer system spray nozzles - adjust

2.5.1 Pre-adjusted spray nozzles (fan-type nozzles)

The spray nozzles are pre-adjusted, but small differences in height can be adjusted.



Note

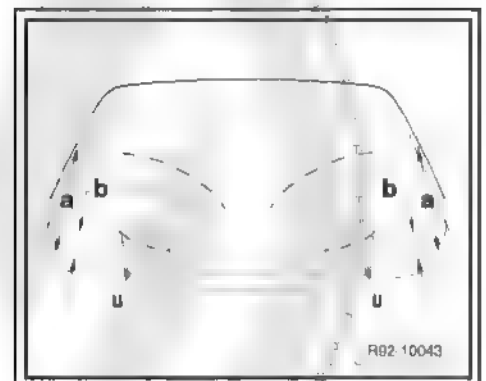
- ◆ If the spray jet is irregular or cannot be adjusted to the centre of the washer area, the nozzle must be replaced (repair measure) ⇒ [page 82](#).
- ◆ Under no circumstances should needles or similar objects be used, since this might damage the nozzle's water passage.
- ◆ The washer jets cannot be cleaned in the opposite direction of the jet (e.g. blowing from the front).

Nozzle jet position:

a - 480 mm

b - 6.50 in

If the two action surfaces of the nozzle jet are not according to the dimensions -a- and -b-, the jet height must be adjusted as explained below:



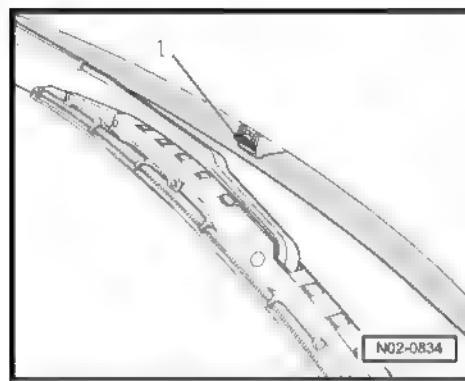


- Adjust the jet through the nozzle tab-1- by moving it slightly with your hand, upward or downward, with the front bonnet closed.



Note

To perform the adjustment, support the ejector with your hand to prevent it from moving from the housing.



2.6 Tightening torque - windscreen and rear window washer system

Location	Tightening torque
Reservoir for the windscreen washer system	$5 \pm 0.5 \text{ Nm}$



3 Rear window wiper system



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



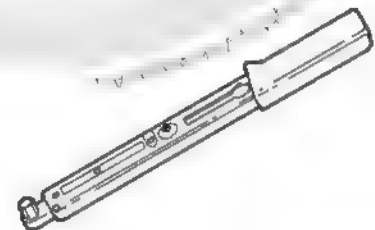
Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (ft. 1/2") - VAG 1331-

V.A.G 1331

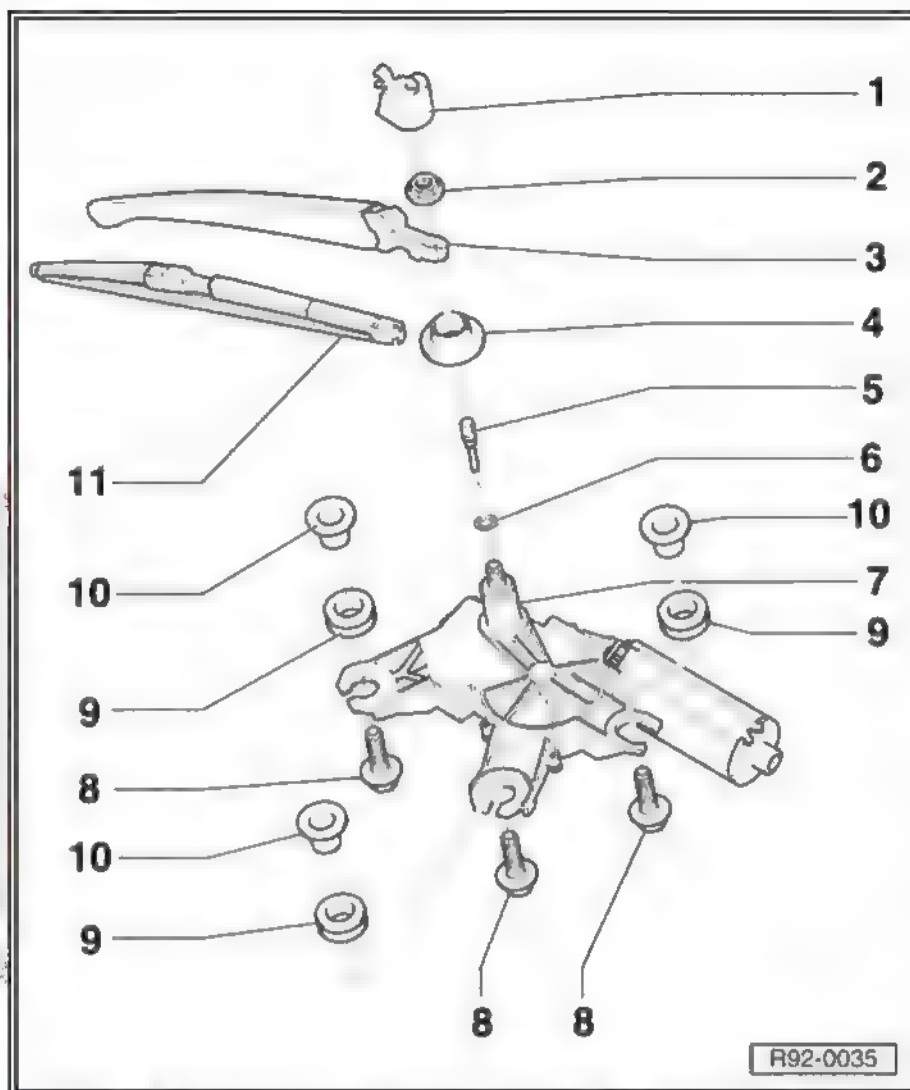


Q00-10065

3.1 Rear window wiper and washer system - overview



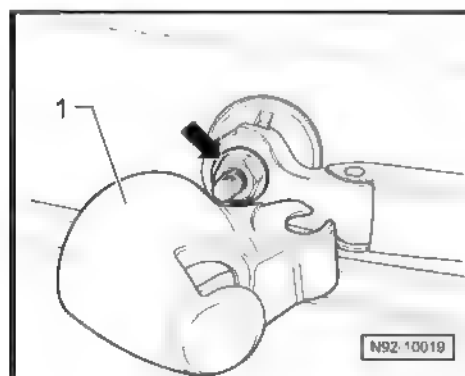
- 1 - Protection cover
- 2 - Hexagonal nut
□ 12 ± 1.2 Nm.
- 3 - Rear window wiper arm
□ Remove and install
□ Adjust ➔ [page 88](#).
- 4 - Sealing eyelet
□ Replace if damaged.
- 5 - Spray nozzle
□ Replace ➔ [page 91](#).
□ Adjust ➔ [page 91](#).
- 6 - Sealing ring
□ Replace if damaged.
- 7 - Rear window wiper motor - V12-
□ Remove and install
➔ [page 87](#).
- 8 - Screw
□ 8 ± 0.8 Nm.
- 9 - Rubber washer
- 10 - Spacer
□ Replace if damaged.
- 11 - Wiper blade
□ Remove and install
➔ [page 88](#).



3.2 Rear window wiper arm - remove and install

3.2.1 Removal

- Raise the protective cover -1- of the rear window wiper.
- Loosen hexagonal nut -1- (12 Nm), but do not remove it completely.
- Tilt the wiper arm and release it by means of sideways movements in the cone.
- Remove the fastening nut -arrow- and remove the rear window wiper arm.

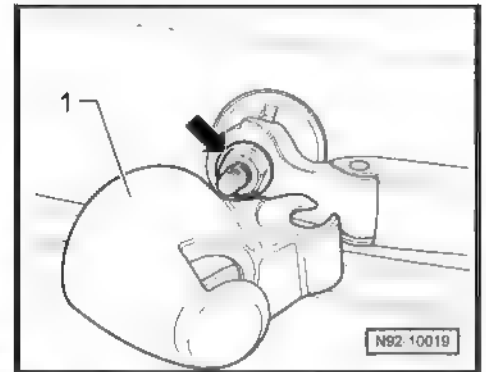


3.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following



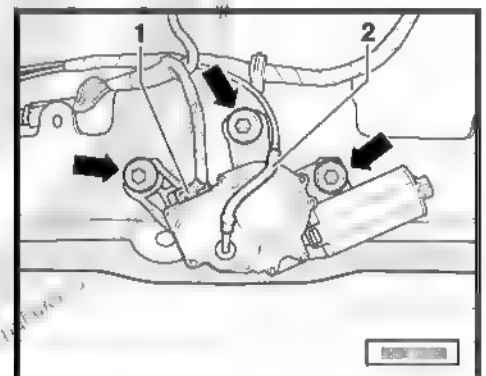
- To place the wiper motor in the end-of-course position, turn the rear window wiper switch on / off with the ignition on.
- Fit the rear window wiper arm on the resting position
➔ [page 88](#) .
- Tighten fastening nut -arrow- to the specified torque
➔ [page 89](#) .



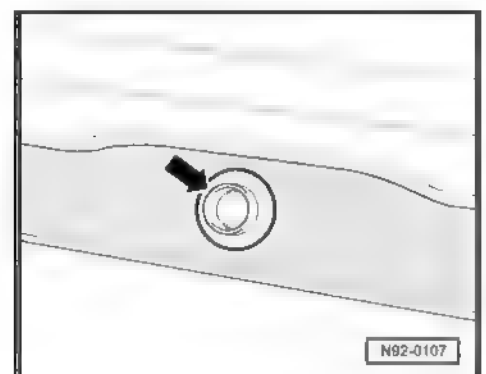
3.3 Rear window wiper motor - V12- - remove and install

3.3.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove rear window wiper arm ➔ [page 86](#) .
- Remove the rear door lining ➔ General body repairs, interior: Rep. gr. 970 ; Lining / insulation .
- Disengage connector -1- of the Rear window wiper motor - V12- and disconnect the hose -2- from the spray nozzle.
- Loosen the fastening screws -arrows- (8 Nm) and remove the Rear window wiper motor - V12- .



Upon removal, observe the sealing eyelet -arrow- to keep it correctly fitted on the rear window.





3.3.2 Installation

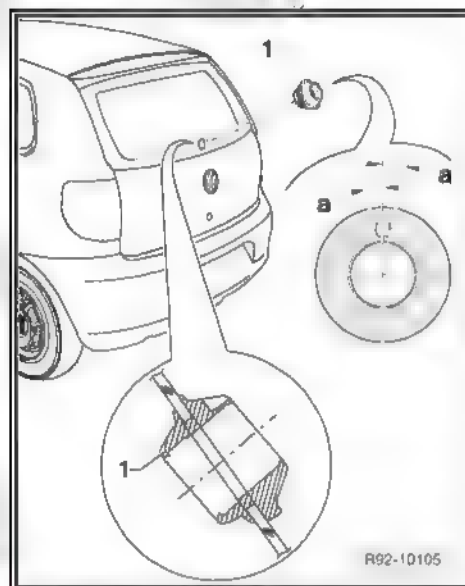
Installation is performed in reverse sequence to the removal, considering the following



WARNING

Observe the correct assembly position for the sealing eyelet, in order to prevent water from infiltrating into the vehicle.

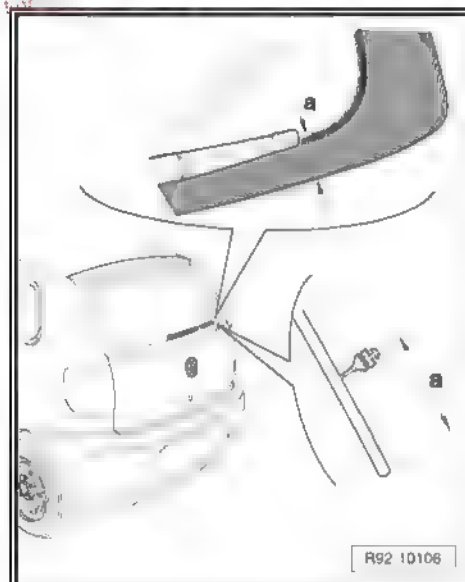
- Install sealing eyelet -1- on rear window so to adjust measure -a- to $\pm 10^\circ$.
- Tighten the fastening nuts and screws to the specified tightening torque ⇒ [page 89](#) ,



3.4 Rear window wiper blade resting position - adjust

The distance -a- between the rear window wiper blade rubber and the lower edge of the window must be of 41 ± 5 mm.

- If necessary, adjust the rear window wiper resting position by moving the wiper rod.
- Tighten the fastening nut with the specified torque ⇒ [page 89](#) .



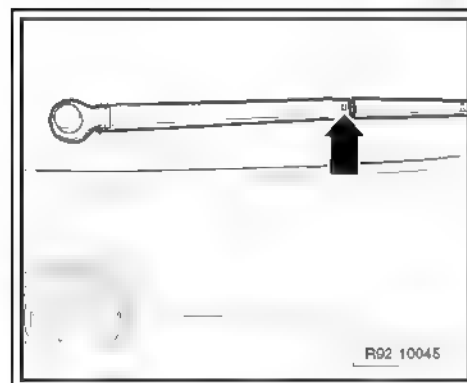
3.5 Rear window wiper blade - remove and install

3.5.1 Removal

- Raise the rear window wiper arm.



- Press the blade lock -arrow- and pull it out of the rear window wiper arm to remove it



3.5.2 Installation

Installation is performed in reverse sequence to the removal.

3.6 Tightening torques - rear window wiper system

Location	Tightening torque
Rear window wiper motor	$8 \pm 0.8 \text{ Nm}$
Rear window wiper arm	$12 \pm 1.2 \text{ Nm}$



4 Rear window washer system



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery, [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

4.1 Rear window washer system - assembly overview

1 - Spray nozzle

- ☐ Replace ⇒ [page 91](#).
- ☐ Adjust ⇒ [page 91](#).

2 - Windscreen washer pump connector Rear window washer pump - V5- and/or Rear window washer pump - V13-

3 - Windscreen washer pump - V5- and/or Rear window washer pump - V13-

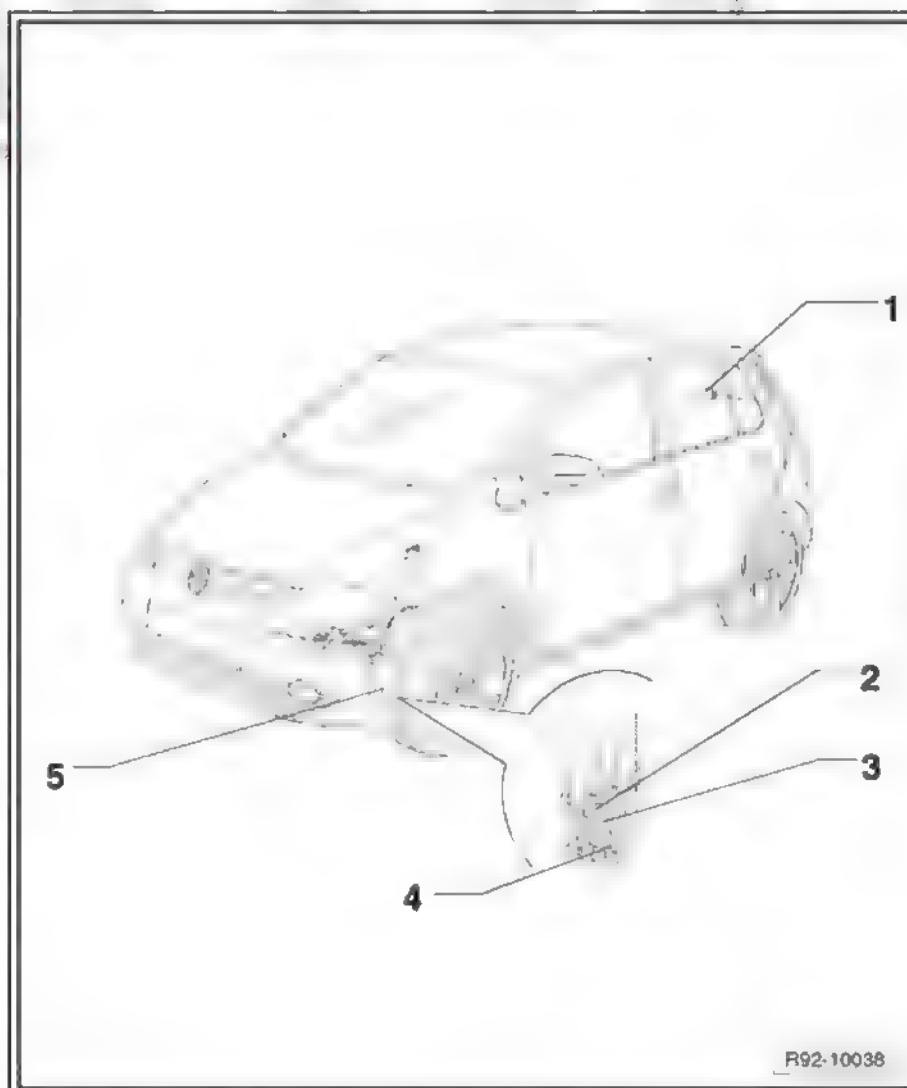
- ☐ Remove and install ⇒ [page 82](#).

4 - Rear washer hose

- ☐ Connections ⇒ General information; Rep. gr. 92 ; Windscreen, rear window and headlight washer and wiper .
- ☐ Repair ⇒ General information; Rep. gr. 92 ; Windscreen, rear window and headlight washer and wiper .

5 - Reservoir for the windscreen and rear window washer system

- ☐ Remove and install



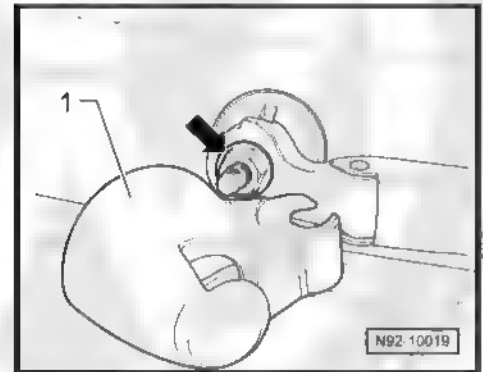


→ [page 81](#) .

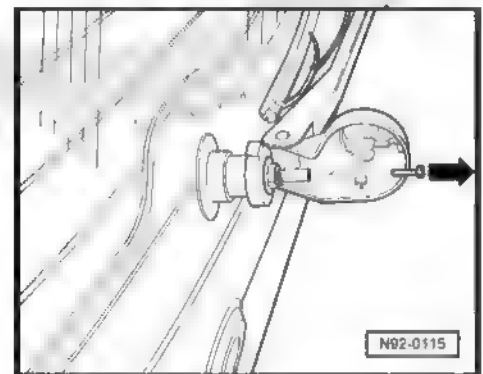
4.2 Spray nozzle - replace

4.2.1 Removal

- Place the rear window wiper on the resting position.
- Raise the protective cover -1- of the rear window washer system.



- Carefully remove the spray nozzle towards the arrow-with suitable pliers.



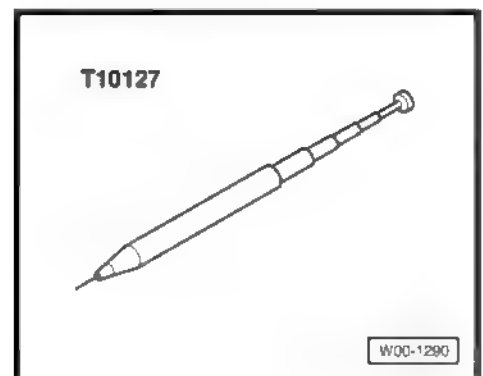
4.2.2 Installation

- Insert the washer jet up to the stop on the wiper shaft, so that the washer jet opening faces upwards.
- Lower the protection cover.

4.3 Rear window washer system spray nozzle - adjust

Special tools and workshop equipment required

- ◆ Adjusting device - T 10127-



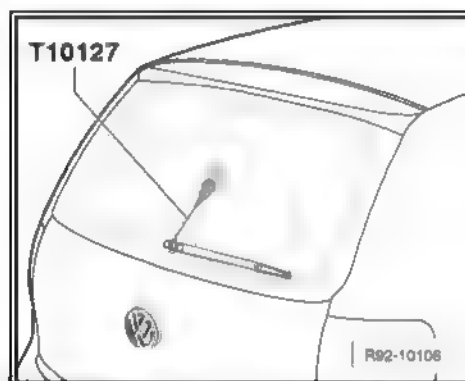


Note

- ◆ *If the washer jet is irregular or cannot be adjusted to the centre of the washer area, the washer jet must be replaced (repair measure) ➔ [page 91](#).*
- ◆ *Under no circumstances should needles or similar objects be used, since this might damage the nozzle's water passage.*
- Adjust the spray nozzle so the jet is sprayed to the centre of the wiper action area.

The nozzle water jet must fall on the middle of the area to be cleaned.

- If necessary, adjust them with the Adjustment device - T 10127- , as indicated.





94 – – Lights, bulbs, switches - exterior – –

1 Main headlights



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ⇒ [page 1](#).



Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

1.1 Main headlights - assembly overview



1 - Left front indicator light lamp - M5- and/or Right front indicator light lamp - M7-

- ☐ Incandescent lamp PY (12V - 21W).
- ☐ Main headlight (single) - change lamp ➔ [page 98](#) .
- ☐ Main headlight (dual) - change lamp ➔ [page 100](#) .
- ☐ Main headlight (Europe) - change lamp ➔ [page 101](#) .

2 - Left front sidelight lamp - M1- and/or Right front sidelight lamp - M3-

- ☐ Incandescent lamp (12V - 5 W).
- ☐ Main headlight (single) - change lamp ➔ [page 97](#) .
- ☐ Main headlight (dual) - change lamp ➔ [page 99](#) .
- ☐ Main headlight (Europe) - change lamp ➔ [page 100](#) .

3 - Left front turn signal indicator light - M5- and/or Right front turn signal indicator light - M7- socket

4 - Left headlight beam reach control motor - V48- and/or Right headlight beam reach control motor - V49-

- ☐ Remove and install ➔ [page 96](#) .

5 - Protection cover

6 - Left low beam light - M29- and Left high beam light - M30- and/or Right low beam light - M31- and Left high beam light - M32-

- ☐ Halogen lamp H4 (12V - 55/60W).
- ☐ Main headlight (single) - change high and low beam lamp ➔ [page 98](#) .
- ☐ Main headlight (dual) - change high beam lamp ➔ [page 99](#) .
- ☐ Main headlight (dual) - change low beam lamp ➔ [page 99](#) .
- ☐ Main headlight (Europe) - change high and low beam lamp ➔ [page 100](#) .

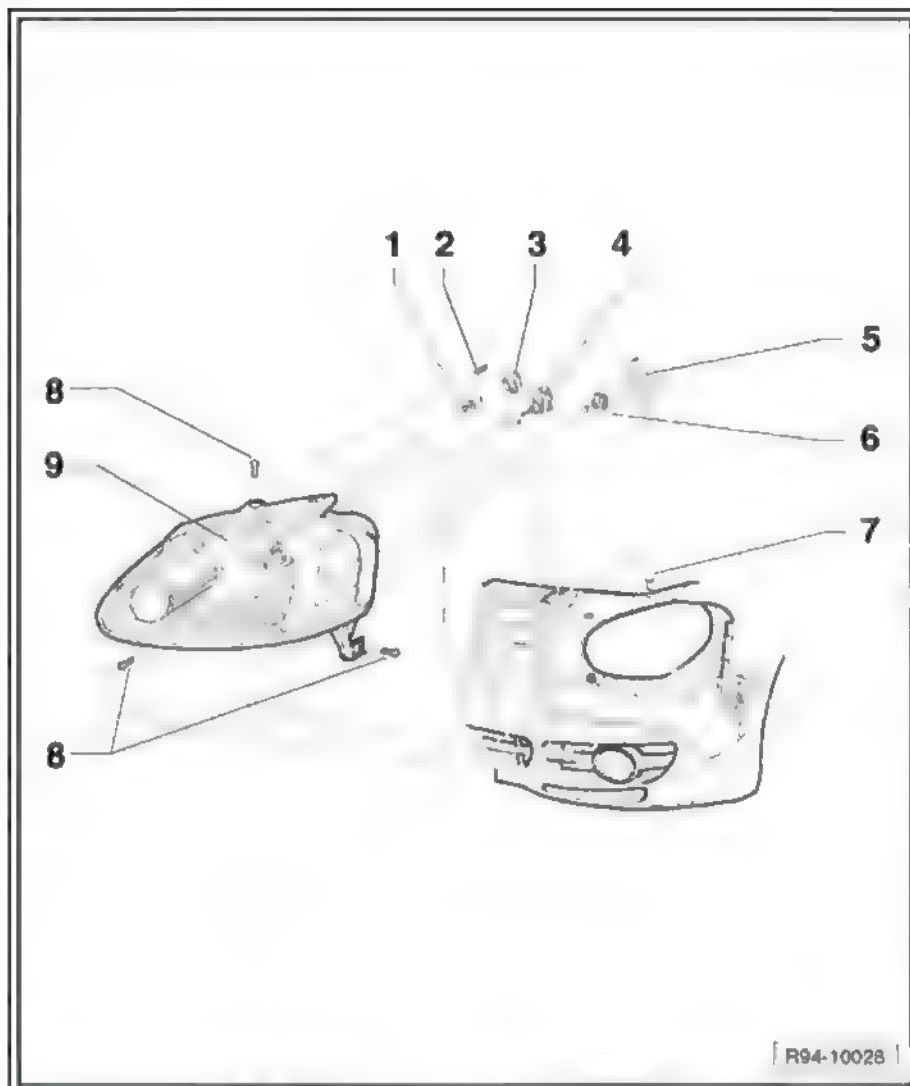
7 - Riveted hexagonal nut

8 - Screws

- ☐ 3 units
- ☐ 3.5 + 0.5 Nm.

9 - Main headlight

- ☐ Remove and install ➔ [page 95](#)
- ☐ Repair the fastening tabs ➔ [page 102](#) .
- ☐ Adapt to right side traffic (Europe) ➔ [page 104](#) .
- ☐ Check adjustment ➔ [page 113](#) .

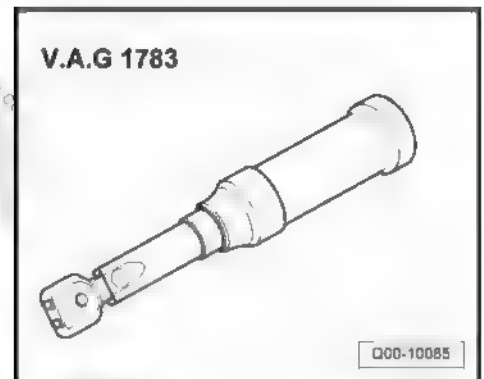




1.2 Main Headlights - remove and install

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-



1.2.1 Removal

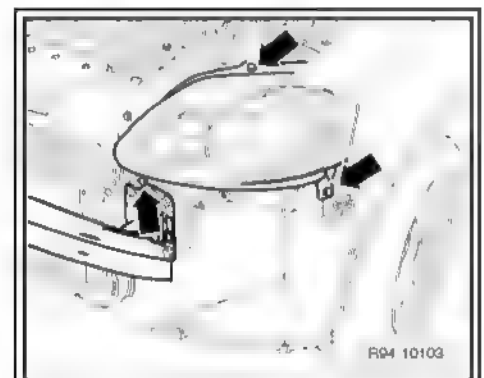


Note

Removing and installing main headlights is identical on both sides; the procedure below refers only to one of the sides.

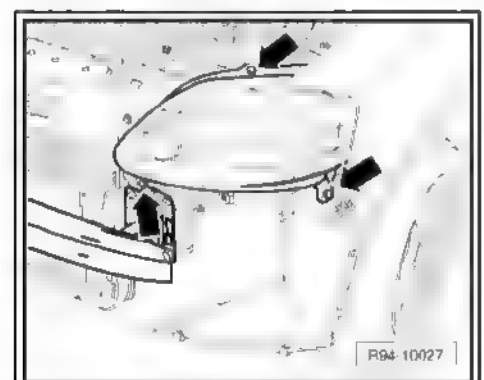
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the front bumper ➔ **General body repairs, exterior**; Rep. gr. 63 ; Front bumper
- Remove the fastening screws -arrows- (3.5 Nm) on main headlight.

Main headlight (dual):



Main headlight (single):

- Remove carefully the headlight from its housing, and disengage connectors.





1.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following

- Tighten the fastening screws to the specified torque
→ [page 106](#) .
- After installation, check main headlight functioning.
- Check, and if necessary, carry out main headlight adjustment
→ [page 113](#) .

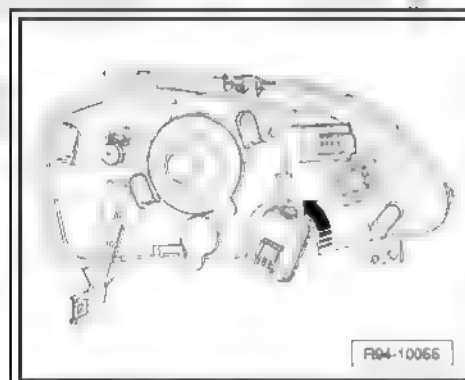
1.3 Left headlight beam reach control motor - V48- and/or Right headlight beam reach control motor - V49- - remove and install

1.3.1 Removal



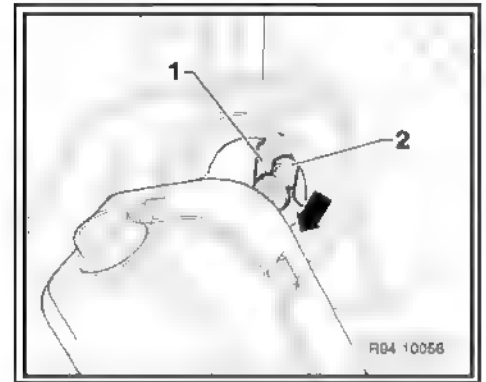
Note

- ◆ *In case of removal and installation of the Left headlight beam reach control motor - V48- and/or Right headlight beam reach control motor - V49- , it is necessary to perform a final check of the headlight adjustment, and re-adjust them if necessary
⇒ [page 113](#) .*
- ◆ *Replacement of control motors is identical on both sides; the procedure below refers only to one side.*
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the main headlight ⇒ [page 95](#) .
- Move the Left headlight beam reach control motor - V48- towards -arrow- and remove it from its housing.





- Move the Left headlight beam reach control motor - V48- away from the headlight case, towards -arrow- in order to remove the ball head -2- from its guide -1-.
- Remove the Left headlight beam reach control motor - V48- from the headlight case.



1.3.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

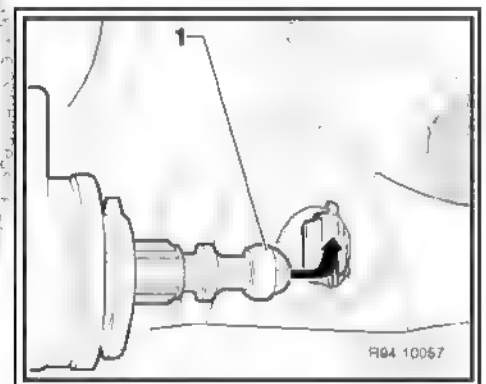
- Carefully insert the ball head -1- of Left headlight beam reach control motor - V48- in its guide -arrow-.



Note

During installation, pay attention on correct seating of the sealing ring of the Left headlight beam reach control motor - V48- to prevent water from penetrating into and damaging the headlight.

- After installation, check the headlight functioning with the motor.
- Check, and if necessary, carry out main headlight adjustment [page 113](#).



1.4 Main headlights (single) - change lamps



Note

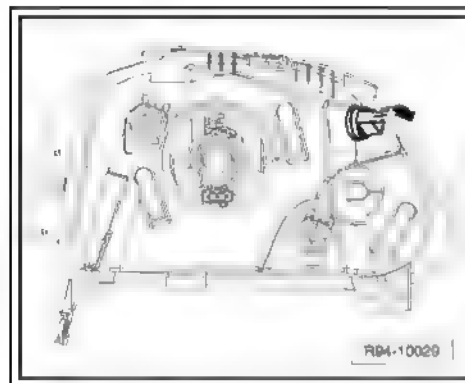
- ◆ *Never touch the glass bulb when installing a lamp. The fingers leave traces of fat on the glass envelope, which evaporate when the lamp is turned on, causing the glass to cloud over.*
- ◆ *Replacement of the main headlight lamps is identical on both sides; the procedure below refers only to one of the headlights.*

1.4.1 Left front sidelight lamp - M1- and/or Right front sidelight lamp - M3- - replace

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the lamp connector.

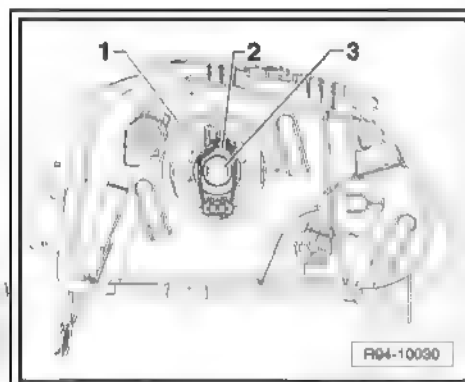


- Remove the socket with lamp by turning it towards the -arrow-
- Remove the lamp from the socket.
- Install a new lamp in the socket.
- After installation, check the light functioning.



1.4.2 Left low beam light - M29- and Left high beam light - M30- and/or Right low beam light - M31- and Left high beam light - M32- - replace

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the lamp connector.
- Remove the protection cover.
- Release the locking ring -1- from the socket -2-.
- Remove the lamp -3- from the reflector.
- Install new lamp in the reflector.
- Fit the circlip.
- Fit the connector.
- Install the protection cover
- After installation, check the light functioning.
- Check and carry out the headlight adjustment, if necessary
⇒ [page 113](#) .

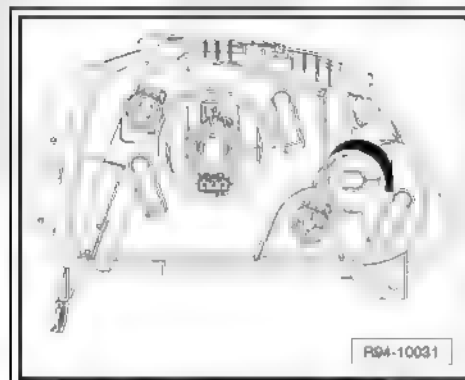


1.4.3 Left front indicator light lamp - M5- and/or Right front indicator light lamp - M7- - replace

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the lamp connector.
- Remove the socket with lamp by turning it towards the -arrow-.
- Remove the lamp from the socket.

Installation is performed in reverse sequence to the removal, considering the following

- After installation, check the light functioning.
- Check and carry out the headlight adjustment, if necessary
⇒ [page 113](#) .





1.5 Main headlights (dual) - change lamps

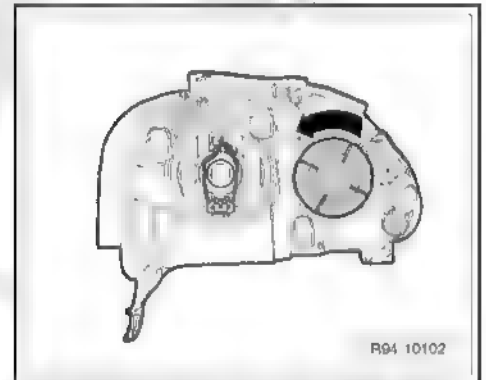


Note

Never touch the glass bulb when installing a lamp. The fingers leave traces of fat on the glass envelope, which evaporate when the lamp is turned on, causing the glass to cloud over

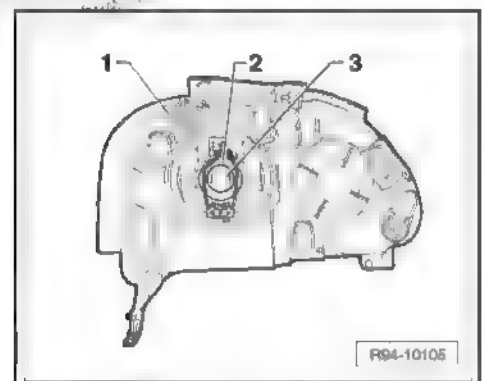
1.5.1 Left high beam lamp - M30- and/or Right high beam lamp - M32- and Left front side light lamp - M1- and/or Right front side light lamp - M3- - replace

- Turn off the ignition and all electrical devices, then remove the ignition key.
- Disconnect headlight connector.
- Remove the protection cover by turning it towards -arrow-.
- Release the locking ring from the socket
- Remove the lamp from the reflector.
- Install a new lamp.
- After installation, check the light functioning.
- Check and carry out the headlight adjustment, if necessary
⇒ [page 113](#) .



1.5.2 Left low-beam headlight lamp - M29- and/or Right low-beam headlight lamp - M31- - replace

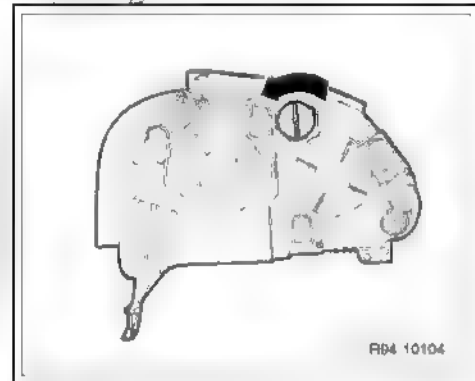
- Turn off the ignition and all electrical devices, then remove the ignition key.
- Disconnect headlight connector.
- Remove the protection cover.
- Release the locking ring -1- from the socket -2-.
- Remove the lamp -3- from the reflector.
- Install new lamp in the reflector.
- Fit the circlip.
- Fit the connector.
- Install the protection cover
- After installation, check the light functioning.
- Check and carry out the headlight adjustment, if necessary
⇒ [page 113](#) .





1.5.3 Left front indicator light lamp - M5- and/or Right front indicator light lamp - M7- - replace

- Turn off the ignition and all electrical devices, then remove the ignition key.
- Remove the socket with lamp by turning it towards the -arrow-.
- Remove the lamp from the socket.
- Install a new lamp.
- After installation, check the light functioning.



1.6 Main headlights (Europe) - change lamps

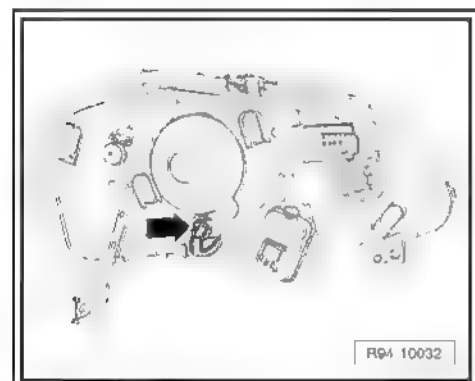


Note

Never touch the glass bulb when installing a lamp. The fingers leave traces of fat on the glass envelope, which evaporate when the lamp is turned on, causing the glass to cloud over.

1.6.1 Left front sidelight lamp - M1- and/or Right front sidelight lamp - M3- - replace

- Turn off the ignition and all electrical devices, then remove the ignition key.
- Remove the protection cover.
- Disconnect the connector from the lamp -arrow-.
- Remove the lamp.
- Install a new lamp.
- After installation, check the light functioning.

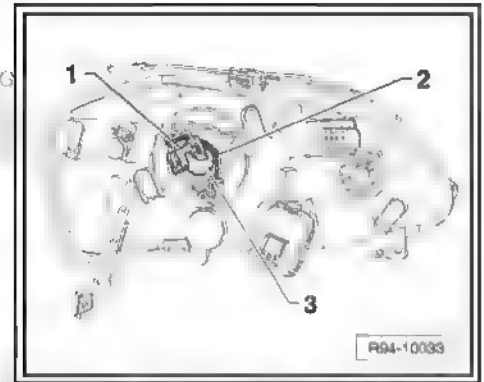


1.6.2 Left low beam light - M29- and Left high beam light - M30- and/or Right low beam light - M31- and Left high beam light - M32- - replace

- Turn off the ignition and all electrical devices, then remove the ignition key.
- Remove the protection cover.

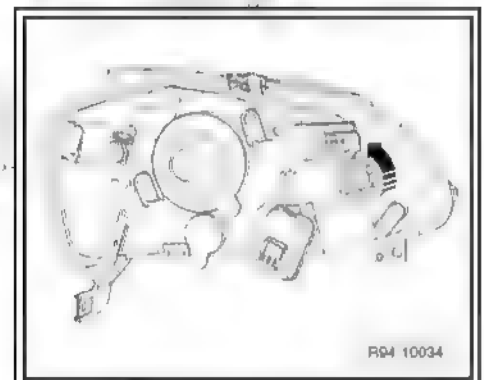


- Remove the connector from the lamp -1-.
- Release the locking ring -2- from the socket.
- Remove the lamp -3- from the reflector.
- Do not touch the glass bulb during the installation.
- Install new lamp in the reflector.
- Fit the circlip.
- Fit the connector.
- Install the protection cover.
- After installation, check the light functioning.
- Check and carry out the headlight adjustment, if necessary
⇒ [page 113](#).



1.6.3 Left front indicator light lamp - M5- and/ or Right front indicator light lamp - M7- - replace

- Turn off the ignition and all electrical devices, then remove the ignition key.
- Remove the socket with lamp by turning it towards the -arrow-.
- Remove the lamp.
- Install a new lamp.
- After installation, check the light functioning.





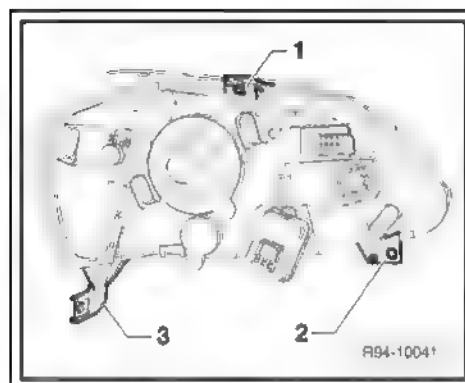
1.7 Main headlights - repair fastening taps

In case of damage of the upper headlight fastening tab -1-, the internal lower headlight fastening tab -2-, or the external lower headlight fastening tab -3-, they can be replaced through the assembly of the repair set. It is not necessary to replace the entire headlight.



Note

- ◆ It is crucial that the headlight case does not present other damages that may lead to an unnecessary assembly of the repair set.
- ◆ There are two different repair sets for the left and the right sides (refer to Electronic parts catalogue).
- ◆ The installation works necessary for this operation are described for one side of the vehicle. For the other side, the procedure is carried out symmetrically.



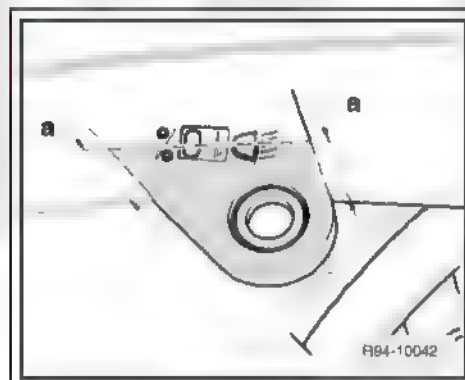
Upper fastening tab -1- - repair ⇒ [page 102](#).

Internal lower fastening tab -2- - repair ⇒ [page 103](#).

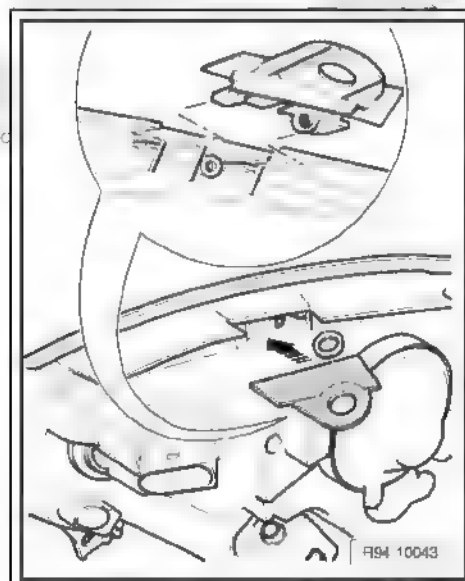
External lower fastening tab -3- - repair ⇒ [page 103](#).

1.7.1 Upper fastening tab - repair

- Remove the main headlight ⇒ [page 95](#).
- Remove all residual material of the damaged fastening tab from the headlight case, and also cut and remove the material corresponding to the elevation -a = 13 mm-, as shown in the illustration.

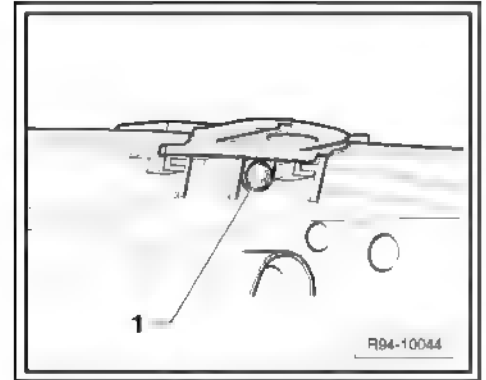


- Install the new fastening tab on the headlight compartment.



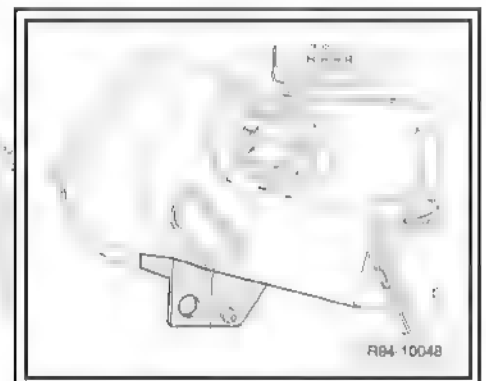


- Tighten the screw -1- firmly to fasten the tab.
- Install the main headlight ➤ [page 95](#) .
- After installation, check the headlight functioning
- Check and carry out the headlight adjustment, if necessary ➤ [page 113](#) .

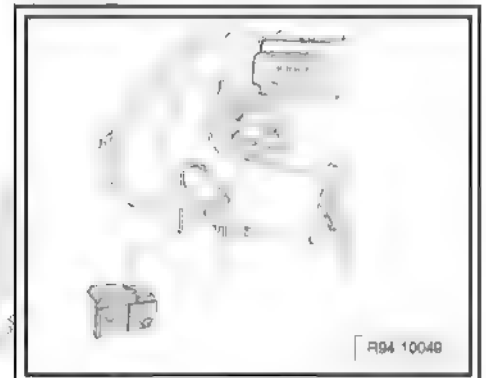


1.7.2 Internal lower fastening tab - repair

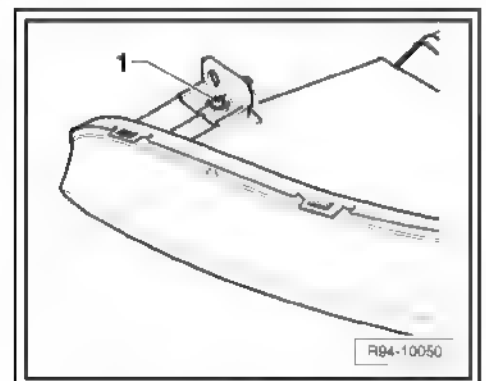
- Remove the main headlight ➤ [page 95](#) .
- Remove the residual material of the damaged fastening tab from the headlight case.



- Install the new fastening tab on the headlight compartment.



- Tighten the screw -1- firmly to fasten the tab.
- Install the main headlight ➤ [page 95](#) .
- After installation, check the headlight functioning
- Check and carry out the headlight adjustment, if necessary ➤ [page 113](#) .

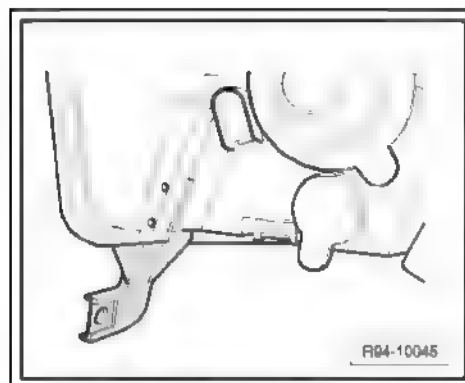


1.7.3 External lower fastening tab - repair

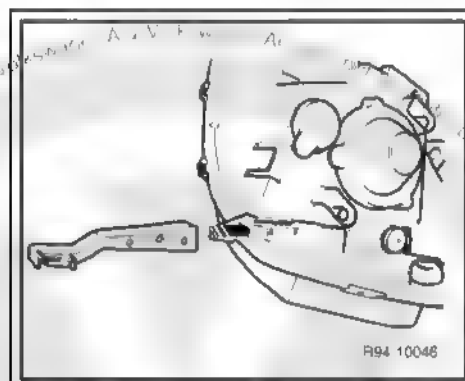
- Remove the main headlight ➤ [page 95](#) .



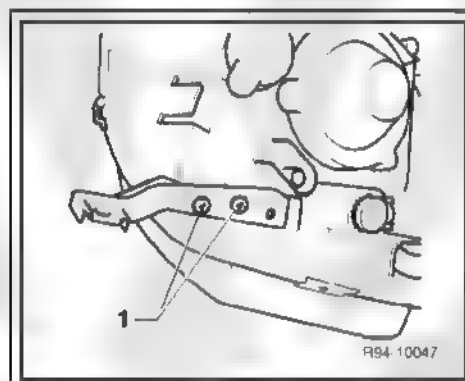
- Remove the residual material of the damaged fastening tab from the headlight case.



- Install the new fastening tab on the headlight compartment -arrow-.



- Tighten the screws -1- firmly to fasten the tab.
- Install the headlight ⇒ [page 95](#) .
- After installation, check the headlight functioning.
- Check and carry out the headlight adjustment, if necessary ⇒ [page 113](#) .



1.8 Adapting main headlights to right-side traffic (Europe)

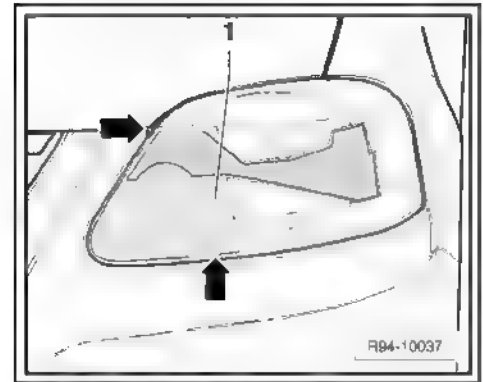
The main headlights are adapted by placing a self-adhesive film in a certain position of the headlight. This self-adhesive film fragments the beam emitted by the headlights, avoiding problems to traffic from the opposite direction. This measure enables the vehicle to temporarily circulate on the left lane, contrary to the one where the vehicle normally travels.

1.8.1 Adapting the left main headlight

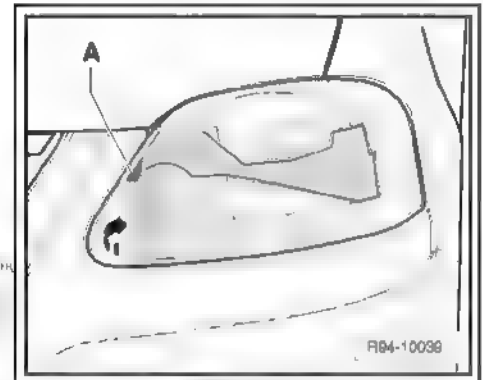
- Clean the headlight surface with a cloth moistened in alcohol.
- Remove the protection film from the assembly sheet.



- Align the assembly sheet -1- in the vehicle headlight as indicated in the figure -arrows-
- Glue the assembly sheet along with the self-adhesive film to the main headlight.



- Carefully remove the assembly sheet from the headlight plastic cover towards the -arrow-, making sure that the self-adhesive film -A- remains on the headlight.

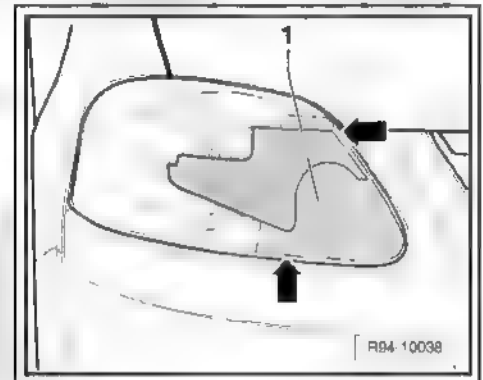


Note

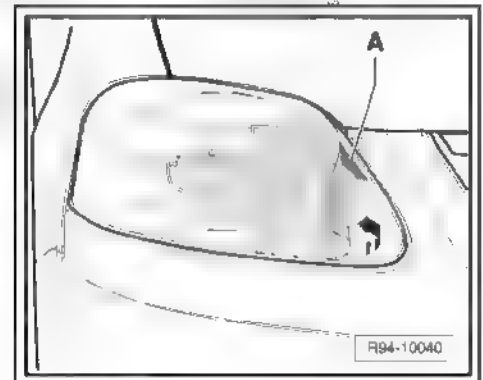
- ◆ *Eventual glue residues that remain in the headlight plastic cover after the assembly sheet is removed must be taken off with alcohol-based and/or water and alcohol-based cleaning products.*
- ◆ *It is recommended to explain to the customer the procedure to be followed if more glue remains appear on the cover surface.*

1.8.2 Adapting the right main headlight

- Clean the headlight surface with a cloth moistened in alcohol.
- Remove the protection film from the assembly sheet.
- Align the assembly sheet -1- in the vehicle headlight as indicated in the figure -arrows-.
- Glue the assembly sheet along with the self-adhesive film to the main headlight.



- Carefully remove the assembly sheet from the headlight plastic cover towards the -arrow-, making sure that the self-adhesive film -A- remains on the headlight.



Note

- ◆ *Eventual glue residues that remain in the headlight plastic cover after the assembly sheet is removed must be taken off with alcohol-based and/or water and alcohol-based cleaning products.*
- ◆ *It is recommended to explain to the customer the procedure to be followed if more glue remains appear on the cover surface.*



1.9 Tightening torque - Main headlights

Location	Tightening torque
Main headlights	3.5 + 0.5 Nm





2 Fog lights



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).

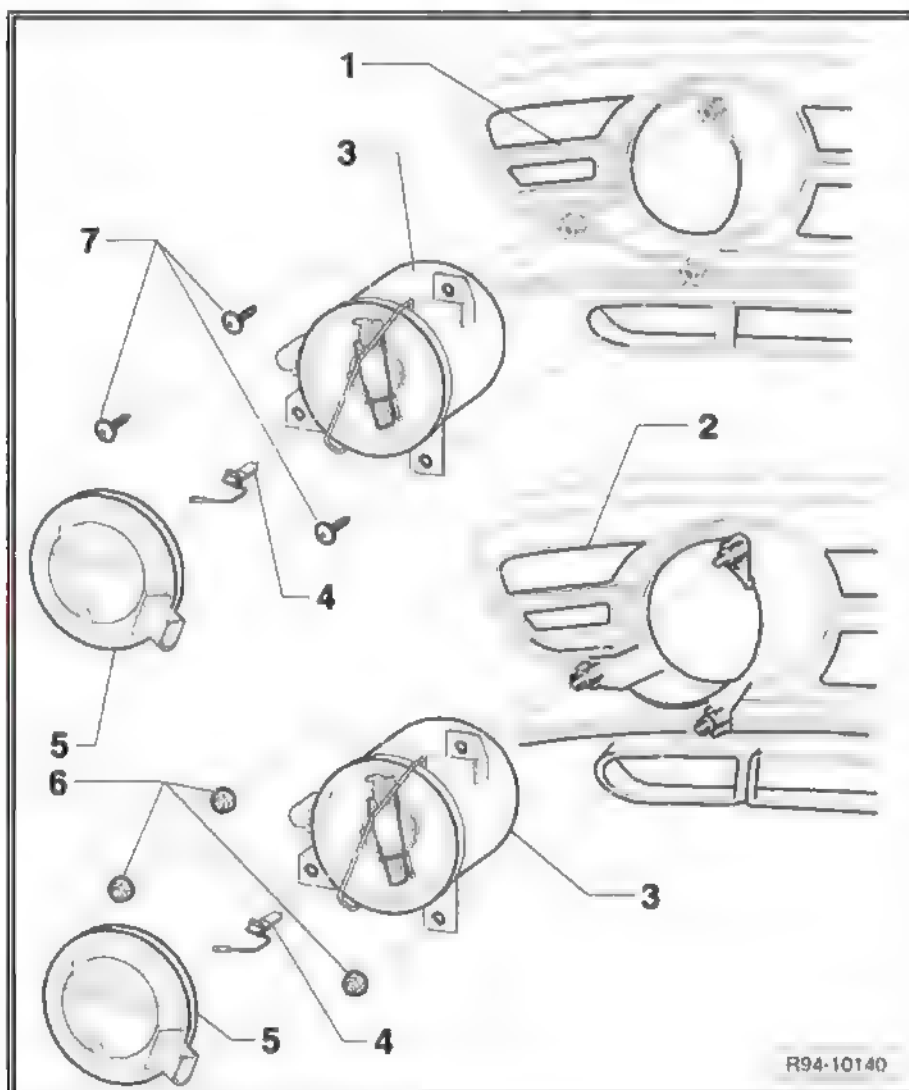


Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

2.1 Fog lights - assembly overview

- 1 - Front protector
 - (► 31/08/2003).
- 2 - Front protector
 - (01/09/2003 ►).
- 3 - Fog lights
 - Remove and install
⇒ [page 108](#).
 - Check adjustment
⇒ [page 113](#).
- 4 - Left fog light lamp - L22-
and/or Right fog light lamp -
L23-
 - Halogen lamp H3 (12V -
55W).
 - Replace ⇒ [page 109](#).
- 5 - Protection cover
- 6 - Hexagonal nuts
 - 2 ± 0.5 Nm.



R94-10140



7 - Screws

- 1 + 0.2 Nm

2.2 Fog lights - remove and install

2.2.1 Removal



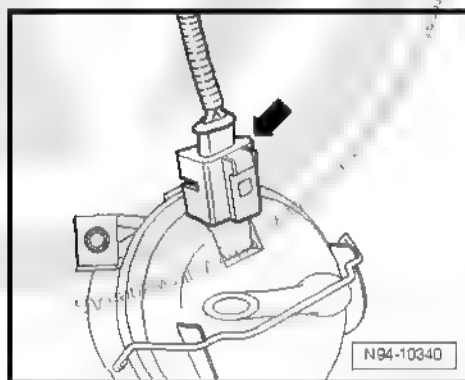
Note

Removal and installation of fog lights are identical on both sides; the procedure below refers only to one of the sides.

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Disengage the fog light connector -arrows-.

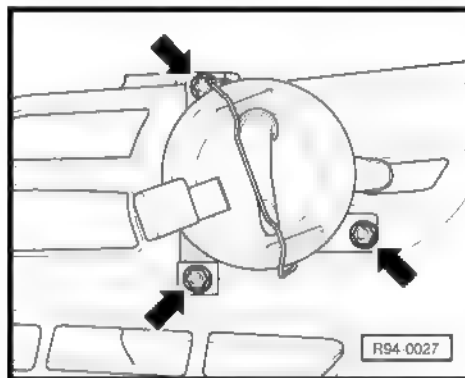
Continuation for:

Fog light (► 08/31/2003):

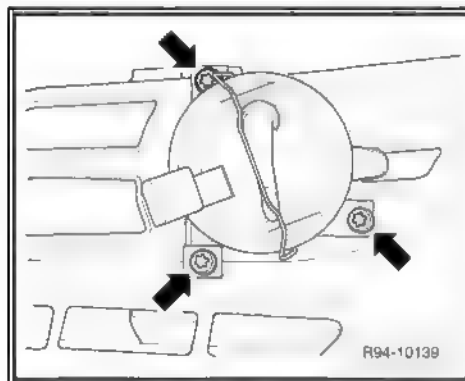


- Loosen nuts -arrows- that fasten the fog light on its housing, and remove the fog light.

Fog light (09/01/2003►):



- Loosen screws -arrows- that fasten the fog light on its housing, and remove the fog light.





2.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten fog light fastening nuts and screws to the specified tightening torque ➔ [page 109](#) .
- After installation, check the fog light functioning.
- Check and carry out the fog light adjustment ➔ [page 113](#) .

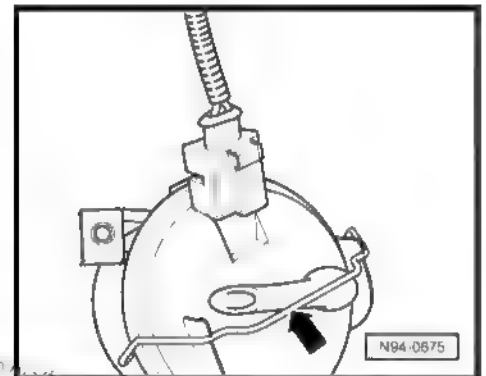
2.2.3 Left fog light lamp - L22- and/or Right fog light lamp - L23- - replace



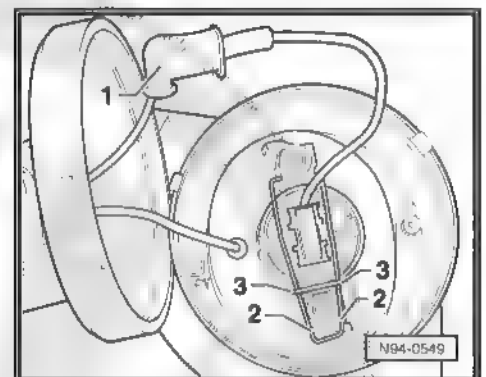
Note

Removing and installing the fog light lamps is identical on both sides; the procedure below refers only to one of the sides.

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Disengage the locking ring -arrow- and remove the cover.



- Disconnect terminals -1- of H3 lamp (12V - 55W).
- Release locks -2- on the retention projections -3-.
- Remove the lamp from the reflector.
- Install the lamp so that the lamp socket gap is on the reflector guide projection.
- After installation, check the light functioning.
- Check and, if necessary, carry out fog light adjustment ➔ [page 113](#) .



2.3 Tightening torque - fog lights

Location	Tightening torque
Fog lights (fastening with screws)	1 + 0.2 Nm
Fog lights (fastening with hexagonal nuts)	2 ± 0.5 Nm



3 Auxiliary headlights



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).

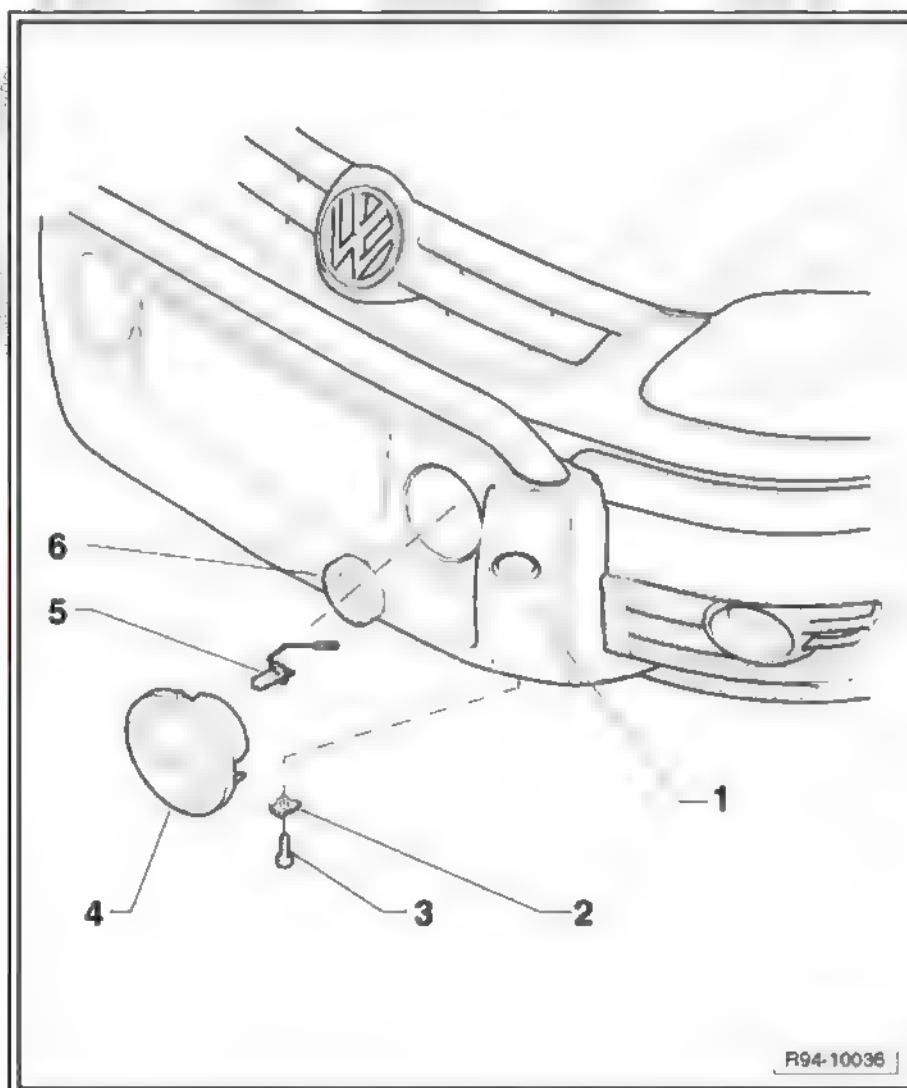


Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

3.1 Auxiliary headlights (► 04/07) - assembly overview

- 1 - Front protector
- 2 - Speed nut
- 3 - Screw
 - 1 Nm.
- 4 - Auxiliary headlight
 - Remove and install → [page 111](#).
 - Check adjustment → [page 113](#).
- 5 - Lamp
 - Halogen lamp H3 (12V - 55W).
 - Replace → [page 112](#).



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6 - Protection cover

3.2 Auxiliary lights (05/07 ➤) - assembly overview

1 - Front protector

2 - Speed nut

3 - Screw

- 1 Nm.

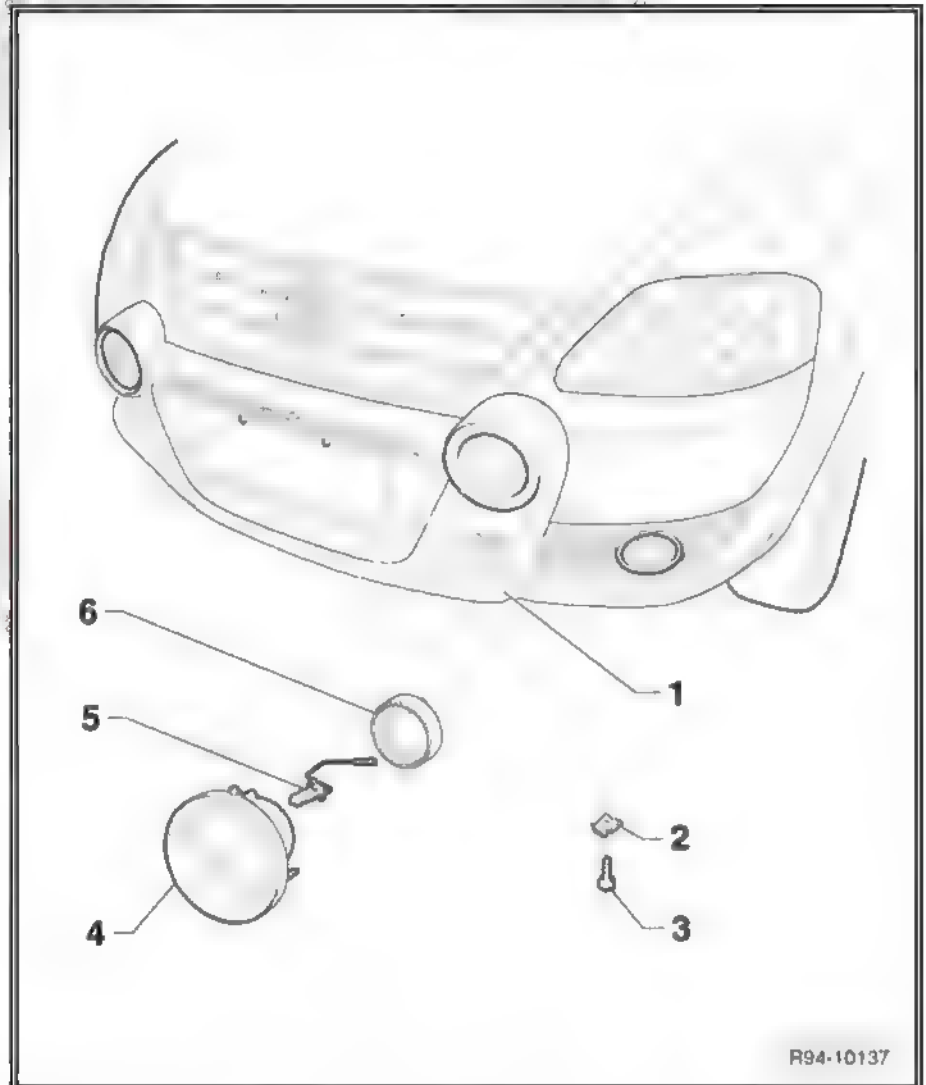
4 - Auxiliary headlight

- Remove and install
⇒ [page 111](#).
- Check adjustment
⇒ [page 113](#).

5 - Lamp

- Halogen lamp H3 (12V - 55W).
- Replace ⇒ [page 112](#).

6 - Protection cover



3.3 Auxiliary headlights - remove and install

3.3.1 Removal



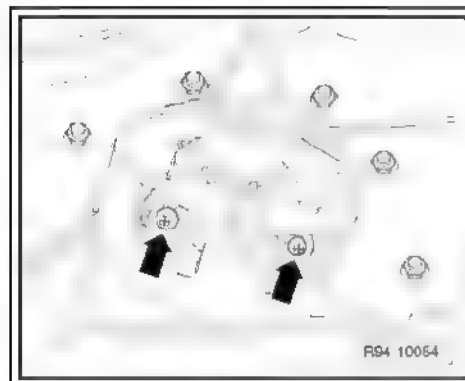
Note

Removing and installing auxiliary headlights is identical on both sides; the procedure below refers only to one of the sides

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).



- Remove the fastening screws -arrows- (1 Nm) of auxiliary headlight.
- Disconnect auxiliary headlight connectors.
- Remove the auxiliary headlight



3.3.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- After installation, check the auxiliary headlight functioning.
- Check the auxiliary headlight adjustment, and adjust if necessary ⇒ [page 113](#).

3.4 Auxiliary headlights - replace lamps



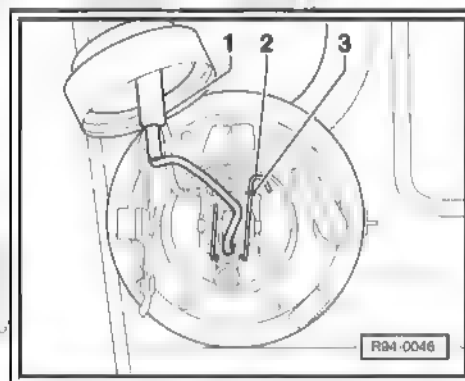
Note

Never touch the glass bulb when installing a lamp. The fingers leave traces of fat on the glass envelope, which evaporate when the lamp is turned on, causing the glass to cloud over.

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Remove the auxiliary headlight ⇒ [page 111](#).
- Remove the protection cover.
- Disengage the locking ring -2-.
- Release H3 (12V - 55W) lamp connections -1- and remove the lamp from reflector -3-.

Installation is performed in reverse sequence to the removal, considering the following:

- After installation, check the auxiliary headlight functioning.
- Check the auxiliary headlight adjustment, and adjust if necessary ⇒ [page 113](#).

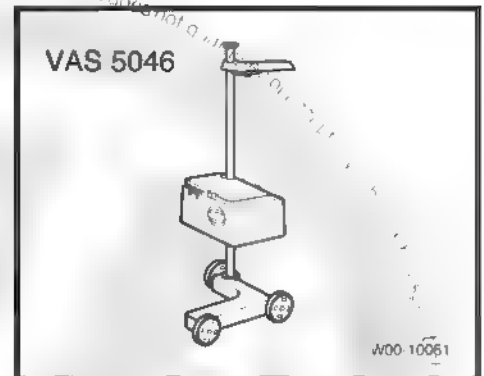




4 Headlights - check adjustment

Special tools and workshop equipment required

- ◆ Headlight aligner - VAS 5046- or Headlight adjustment device - VAS 5047-



In principle, the following checking and adjustment description is valid for every country. However, the guidelines and standards of each country must be considered.

Checking and adjustment conditions:

- Tire inflation pressure OK.
- The headlight lenses must never be damaged or dirty.
- Reflectors and lamps OK.
- The vehicle load must be known.

Load: With a person or 75 kg on the driver's seat of empty vehicles (empty weight):

The weight of an empty vehicle is the weight of the vehicle ready for operation and with a full fuel tank (at least 90%), including the weight of every component required to operation (e.g: spare wheel, tools, towing hook, fire extinguisher, etc).

If the fuel tank is not at least 90% full, then simulate the load as follows:

- Check the tank level on the fuel gauge. Establish the additional weight according to the table below, and put this weight in the luggage compartment.

Filling quantities table

Filling level on fuel indicator	Additional weight in kg
1/4	30
1/2	20
3/4	10
full	0

Example:

When the fuel tank is half full, you must place an additional weight of 20 kg in the luggage compartment.



Note

As additional weight, it is preferable to use fuel containers filled with water (one fuel container with a 5-litre capacity corresponds to a weight of approximately 5 kg).



The vehicle should be moved for a few meters, and pushed down several times on both the front and rear so that the shock absorbers seat properly.

- ◆ The vehicle and the headlight adjustment device must be on the same level → Headlight adjustment device instruction manual
- ◆ The vehicle and the headlight adjustment device must be on a flat surface.
- ◆ Tilting must be adjusted

The housing above the headlight has the tilt values engraved in "%". The headlights must be adjusted according to these data. The percentage is related to a projection distance of 10 meters. A 1.0% tilting value, for example, corresponds to 10 cm.

The button to adjust the headlight range must be in the basic position (-).

4.1 Check headlight adjustment (with the new inspection display without 15° adjustment line).

4.1.1 Main headlights

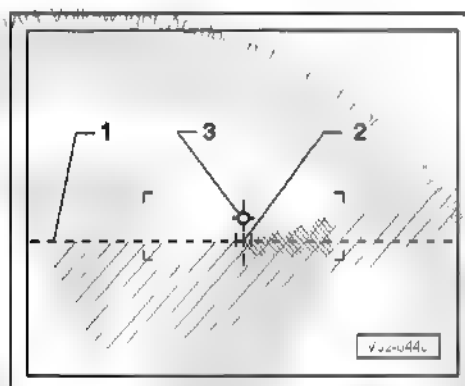
Please check the following:

- With the low beam on, check if the horizontal light-dark limit touches the separation limit -1- of the test surface.
- Check if the point of inflexion -2- between the left horizontal section and the right ascending section of the light-dark limit runs vertically through the central mark -3-. In this case, the light core of the light beam is at right of the vertical line.



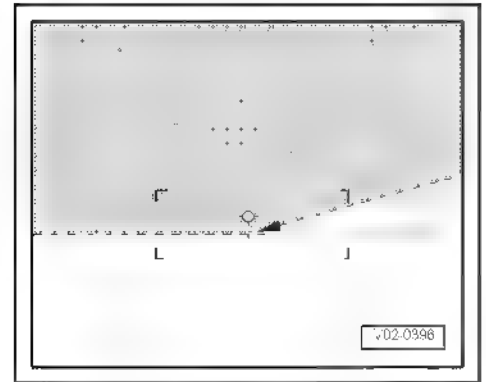
Note

- ◆ Line -1- is the measurement from the ground to the centre of the headlight, minus 120 mm for a distance of 10 m.
- ◆ Line -1- is the measurement from the ground to the centre of the headlight, minus 2.36 in for a distance of 5.47 yd.
- ◆ For an easier determination of the breaking point -2-, cover and then release the left half of the headlight (seen from the driver's side). Then, test the low beam once more.
- ◆ After correctly adjusting the low beam, the high beam is automatically adjusted. This means that the high beam centre must be on the headlight central mark -3-. A 200-mm deviation to the right or to the left, 150 mm upwards and 100 mm downwards is acceptable.





- For the current checking viewer with an adjustment line of 15° , the same adjustment applies for the new checking viewer. To avoid incorrect adjustments, the 15° line will no longer be considered.



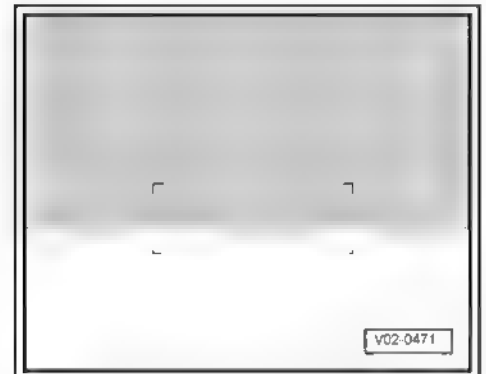
4.1.2 Fog lights

- Check if the light-dark limit reaches the adjustment line and runs vertically over the entire measuring device line.



Note

- ◆ The light-dark separation mark is the measurement from the ground to the centre of the headlight, minus 200 mm for a distance of 10 m.
- ◆ The light-dark separation mark is the measurement from the ground to the centre of the headlight, minus 100 mm for a distance of 5 m.



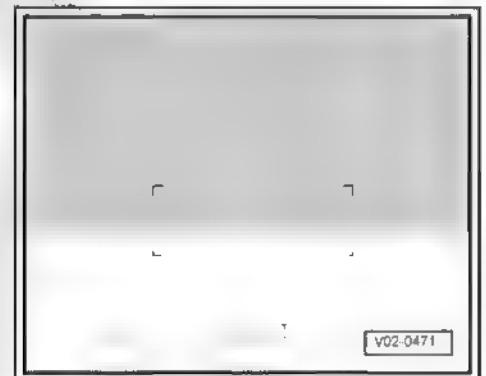
4.1.3 Auxiliary headlights (CrossFox)

- Check if the light-dark limit reaches the adjustment line and runs vertically over the entire measuring device line.



Note

- ◆ The light-dark separation mark is the measurement from the ground to the centre of the headlight, minus 50 mm for a distance of 10 m.
- ◆ The light-dark separation mark is the measurement from the ground to the centre of the headlight, minus 25 mm for a distance of 5 m.



4.1.4 Additional headlights

- Additional headlights in other systems, installed later, must be installed according to their specific instructions.

4.2 Headlights - adjust

4.2.1 Main headlights - adjust



Note

The adjustment of main headlights is identical on both sides, the procedure below refers only to one of the headlights.



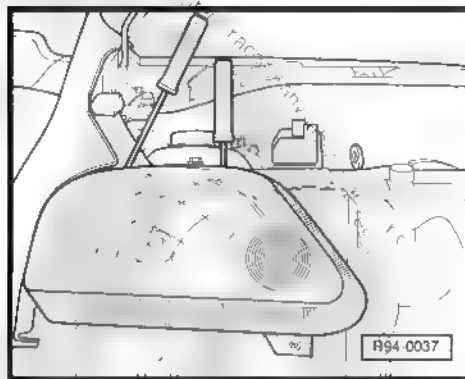
- Adjust the headlights from the front, with a suitable Philips screwdriver.

Both set screws are arranged symmetrically on the left headlight



Note

Please check also if both headlights move symmetrically when positioning the light range.



4.2.2 Fog lights adjust

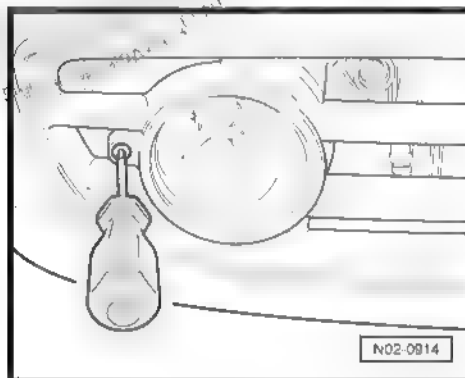


Note

The adjustment of fog lights is identical on both sides; the procedure below refers only to one of the fog lights.

- To reduce the beam focus, turn the setscrew to the right. A side adjustment is not expected.

On the left headlight, the setscrew is arranged symmetrically.



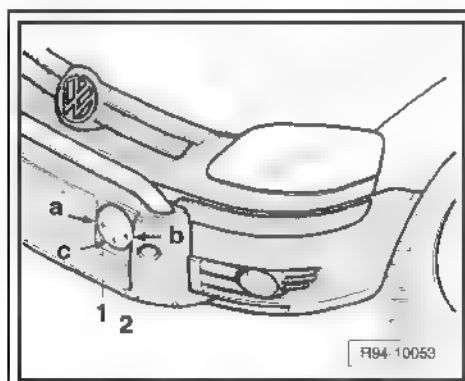
4.2.3 Auxiliary headlights (CrossFox) - adjust



Note

Adjusting auxiliary headlights is identical on both sides; the procedure below refers only to one of the headlights.

- Loosen the screws-1 and 2- only enough to slightly move the headlight.
- Press the headlight or move it forward -c- to the vertical adjustment (height).
- Press the headlight in -a- or -b- for horizontal adjustment (right and left).





5 Side indicator lights



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

5.1 Side indicator lights, remove and install

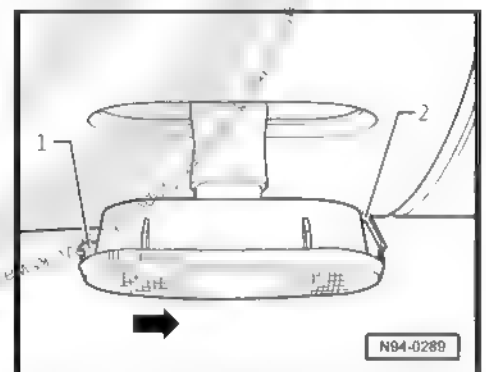
5.1.1 Removal



Note

The side indicator light can only be removed to one direction. You must be very careful during the removal, since it is not possible to see in which side of the the indicator light the support point is placed in, and which side the spring clip is. Trying to forcefully lever the indicator on the spring clip side may damage the indicator or the vehicle painting.

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#).
- With a proper tool, move the indicator light carefully in the support point-1-, towards the -arrow- against the spring clip force direction -2-, and remove the indicator (if necessary, place in advance a masking tape on the painting).
- Remove the rubber support with the lamp from the indicator light case.
- Remove the lamp (12V - 5W) from its socket.



5.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- After installation, check the turn signal indicator functioning



6 Tail lights



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

6.1 Tail lights - assembly overview

1 - Tail light

- ☐ Remove and install
⇒ [page 119](#).

2 - Gasket

3 - Left rear turn indicator lamp - M6- and/or Right rear turn indicator lamp - M8-

- ☐ P21W - 12V (yellow glass).

4 - Left rear fog light lamp - L46-

- ☐ P21W - 12V.
- ☐ The fog light is only present in the left lamp support.

5 - Left reverse gear light lamp - M16- and/or Right reverse gear light lamp - M17-

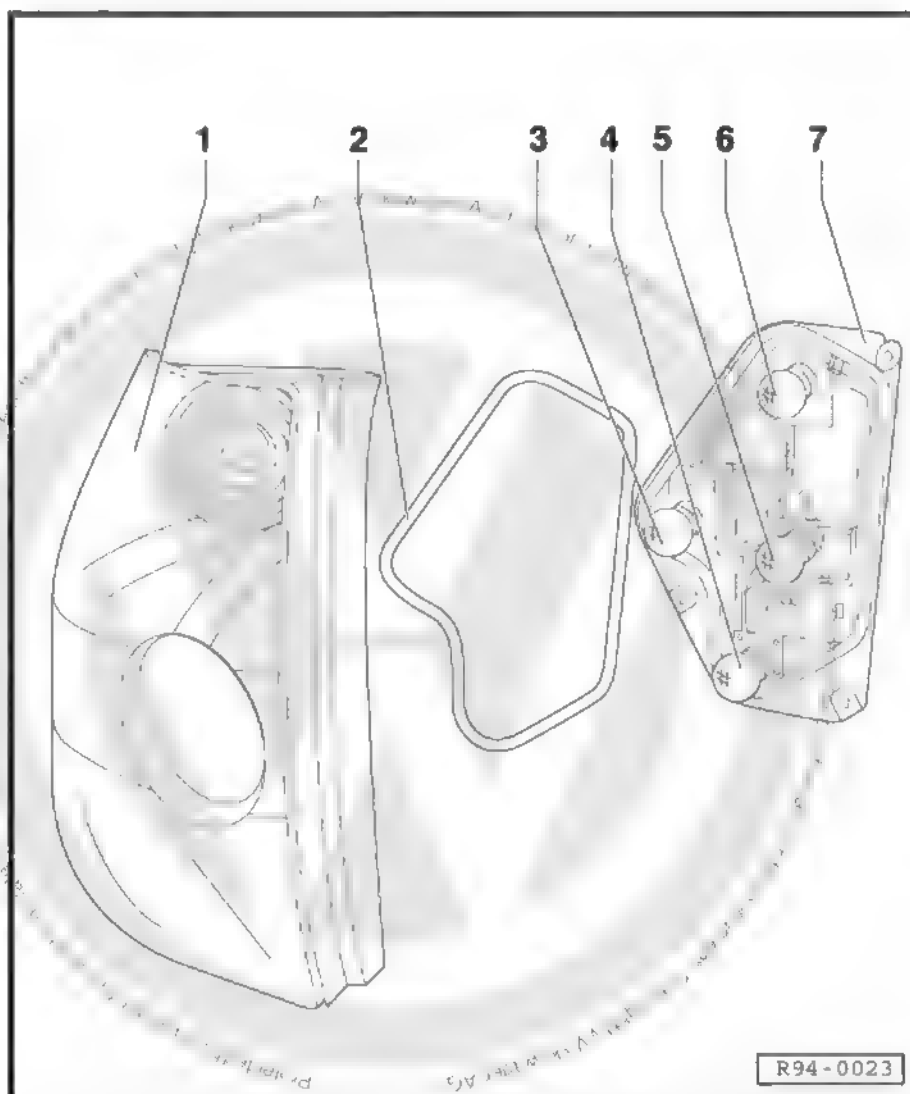
- ☐ P21W - 12V.

6 - Left brake light and tail light lamp - M21- and/or Right brake light and tail light lamp - M22-

- ☐ P21/5W - 12V.

7 - Lamp support

- ☐ Remove and install



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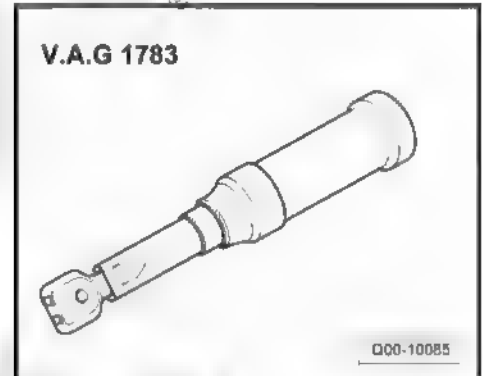


➤ [page 120](#) .

6.2 Tail light remove and install

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-



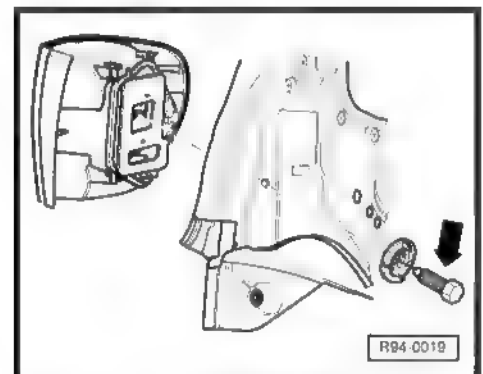
6.2.1 Removal



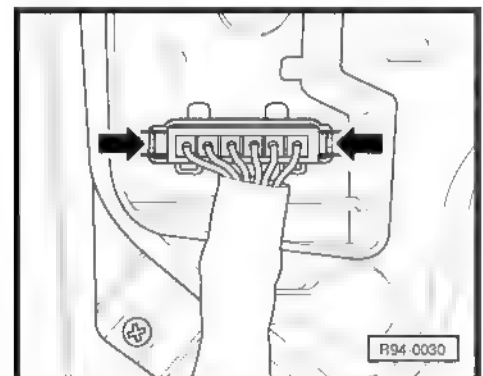
Note

Removing and installing the tail lights is identical on both sides; the procedure below refers only to one side.

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➤ [page 1](#) .
- Loosen and remove the fastening screw -arrow- (2 Nm) from the tail light.
- Push the tail light carefully in order to release the fitting locks.



- Press locks -arrows- and disengage the connector.
- Remove the tail light





6.2.2 Installation

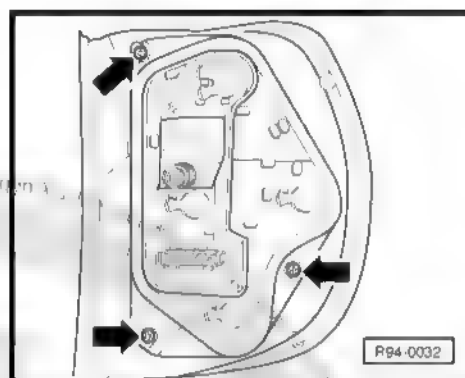
Installation is performed in reverse sequence to the removal, considering the following

- Tighten the fastening screw on tail light to the specified tightening torque → [page 120](#) .

6.3 Tail light lamp support - remove and install

6.3.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the tail light ⇒ [page 119](#) .
- Loosen the fastening screws -arrows- and remove the lamp support.



6.3.2 Installation

Installation is performed in the reverse order to removal.

6.4 Tightening torque - tail lights

Location	part	Tightening torque
Tail light fastening	ss, par	2 ± 0.5 Nm



7 License plate light



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#).



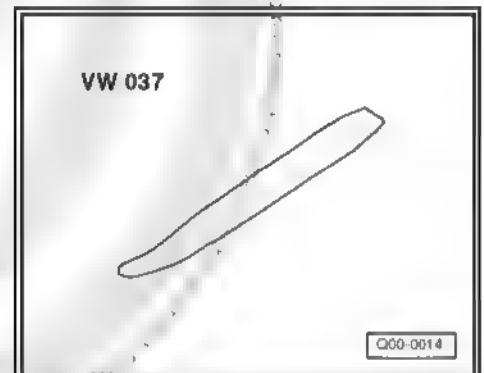
Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

7.1 License plate light - remove and install

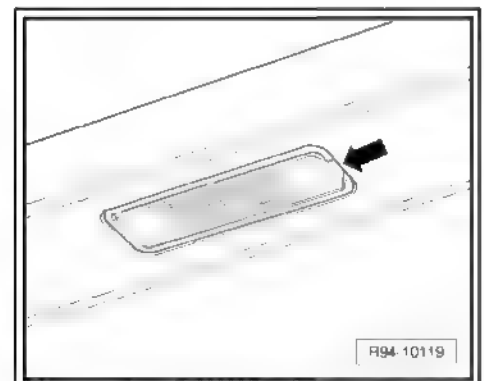
Special tools and workshop equipment required

- ◆ Spatula - VW 037-



7.1.1 Removal

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#).
- Release the lock -arrow- of license plate light.
- Disengage the tail light carefully, and release its connector.
- Remove the license plate light.





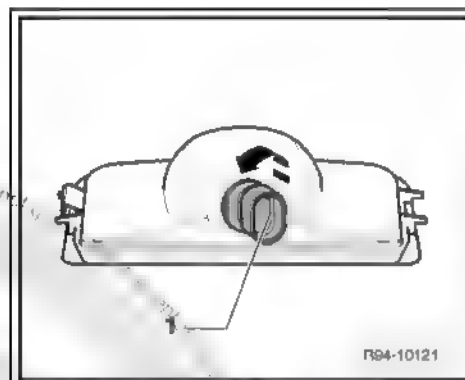
7.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following

- After installing, check the license plate light functioning.

7.2 License plate light - X- - replace the lamp

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Remove the license plate light ⇒ [page 121](#) .
- Release the socket -1- by turning it towards the -arrow-.
- Remove the lamp from the socket.
- After installing the new lamp, check the license plate light functioning.





8 Additional brake light



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#).



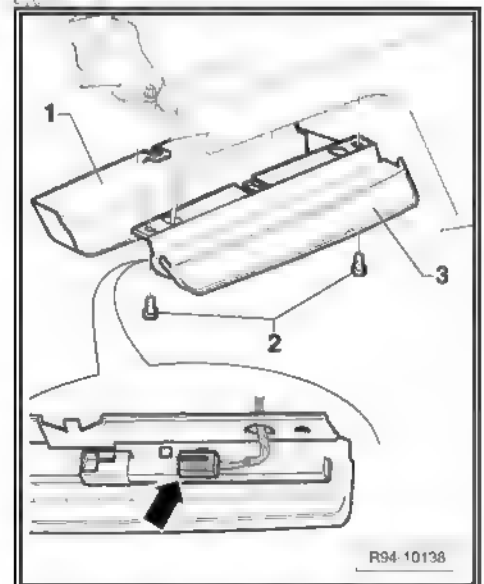
Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

8.1 Auxiliary brake light - remove and install

8.1.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#).
- Remove cover -1- of the auxiliary brake light -3-.
- Disengage the connector -arrow-.
- Loosen and remove fastening screws -2- (1.5 Nm) and remove the auxiliary brake light -3-.



8.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening screws to the specified torque ➔ [page 124](#).
- After installing, check functioning.



8.2 Tightening torque - auxiliary brake light

Location	Tightening torque
Auxiliary light	$1.5 \pm 0.2 \text{ Nm}$





9 Switch set



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#) .



Note

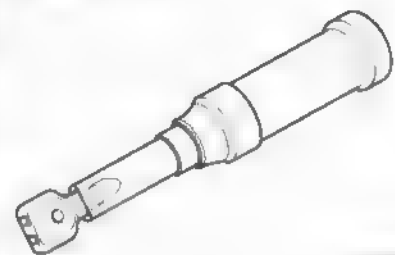
- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A- .
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

- ◆ Spatula - VW 037-

V.A.G 1783



Q00-10085

VW 037



Q00-0014

9.1 Indicator and wiper/washer switches - remove and install

9.1.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .



- Place the steering wheel in centre position (straight wheels)
- Remove the steering wheel ➔ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Remove the steering C-pillar overing ➔ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .

Vehicles with Airbag:

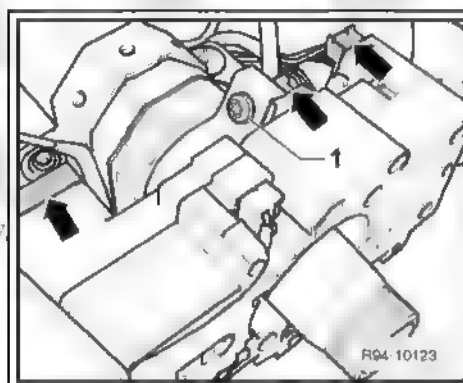
- Remove the contact ring ➔ General body repairs, interior; Rep. gr. 69 ; Occupants' protection .

Vehicles with ESP:

- Remove the Steering angle sensor - G85- ➔ Running gear, axles, steering; Rep. gr. 48 ; Steering .

Continued for all vehicles:

- Remove the fastening screw-1 - (3 Nm) from the switch set.
- Disconnect the switch set connectors -arrow- .
- Remove the switch set.



9.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening screw to the specified torque
⇒ [page 126](#) .

9.2 Connectors pinout in the switch set for turn lights and window wipers/washers

The pinout of the switch set connectors for turn lights and window wipers/washers is described in the electrical diagrams ➔ Current flow diagrams, Electrical fault finding and Fitting locations.

9.3 Tightening torque - switch set

Location	Tightening torque
Switch set	3 Nm



10 Steering lock set



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#) .



Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A- .*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

10.1 Steering lock set - remove and install

10.1.1 Removal

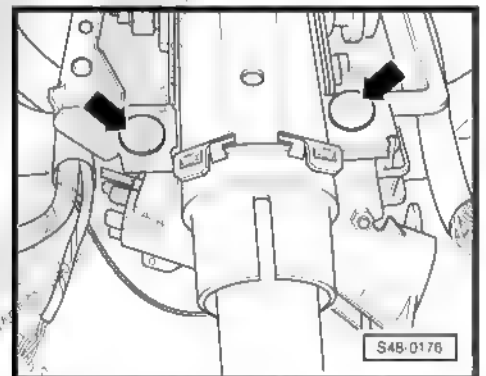
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the turn signal light and wiper/washer switches ➔ [page 125](#) .
- Remove the key cylinder ➔ [page 129](#) .
- Remove the ignition and starter switch ➔ [page 131](#) .
- Remove the snap bolts -arrows- using a drill with a suitable drill bit or chisel, if necessary.



WARNING

Please wear protective goggles.

- Remove the steering lock set.



10.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

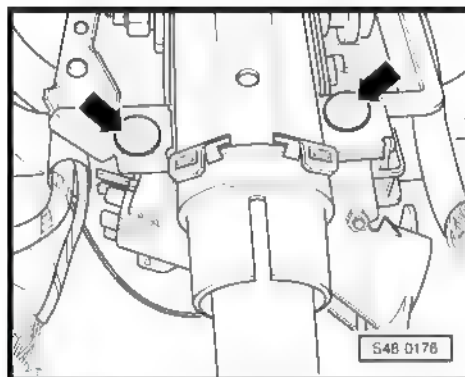
- Position the steering lock set.



Note

Check the positioning of the steering lock set in the steering column.

- Carefully tighten the snap bolts until their heads -arrows- snap.
- Install the turn indicator and wiper/washer switches
→ [page 125](#) .
- Install the key cylinder → [page 129](#) .
- Install the ignition and starter switch → [page 131](#) .





11 Ignition/starter switch and key cylinder



WARNING

Before working on the electrical system, it is necessary to disconnect the battery's earth strap → [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

11.1 Key cylinder - remove and install

11.1.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#).
- Place the steering wheel on the central position (straight wheels).
- Remove the steering wheel ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering .
- Remove upper and lower steering column coverings ⇒ General body repairs, interior; Rep. gr. 70 ; Linings/insulations
- Carefully disconnect the connector -arrow- from the Immobilizer reading coil - D2- in the key cylinder.



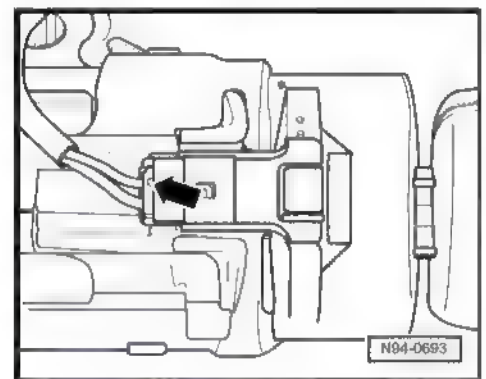
Note

The Immobilizer reader coil - D2- is fastened to the key cylinder and cannot be replaced individually.

- Insert the ignition key in the key cylinder, and turn to "on" position.

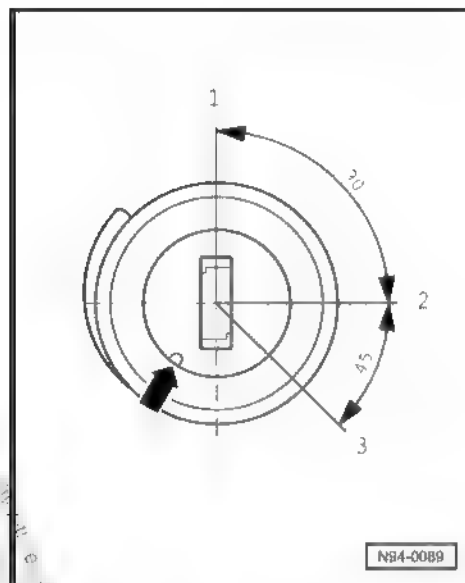
Key positions in the key cylinder:

- 1 - Off "position"
- 2 - On "position"
- 3 - Start "position"



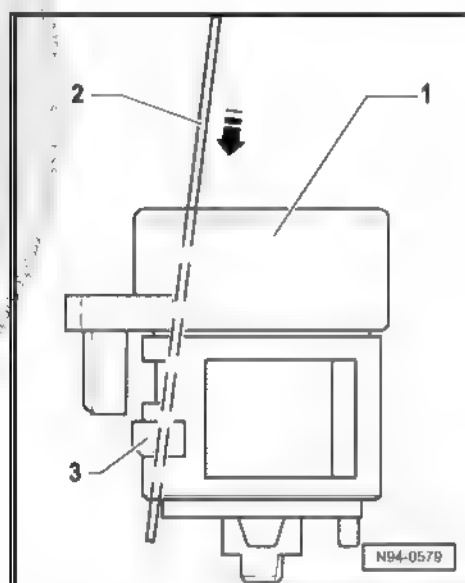


- Insert a steel wire (approx. \varnothing 1.2 mm) in the hole beside the key cylinder -arrow-.



- Unlock the safety lever from the key cylinder with the steel wire -arrow-, and extract the key cylinder from the steering lock set.

- 1 - Key cylinder
- 2 - Steel wire (approx. \varnothing 1.2 mm)
- 3 - Safety lever



11.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Insert the ignition key in the key cylinder, and turn to "on" position.
- Unlock the retention lever with a wire (approx. \varnothing 1.2 mm) and place the key cylinder in the steering lock set.



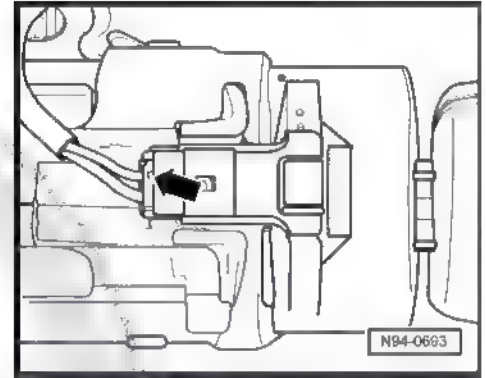
Note

When positioning the key cylinder, make sure that the Immobilizer reader coil - D2- connection is in the steering lock set guide.

- Remove the wire from the key cylinder and check if the cylinder seats correctly in the steering lock set.



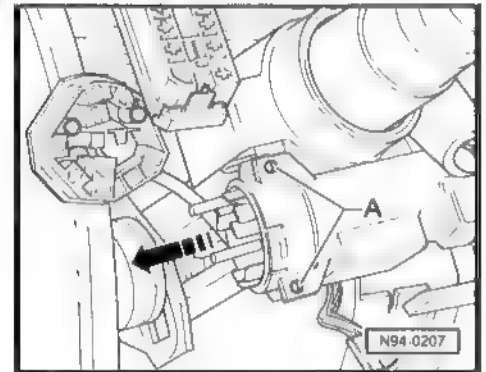
- Engage the connector -arrow- for the Immobilizer reading coil - D2- in the key cylinder.



11.2 Ignition switch - D- - remove and install

11.2.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the turn signal light and wiper/washer switches ➔ [page 125](#) .
- Disconnect the multiple connector from the Ignition switch - D- .
- Remove the sealing paint from fastening screws -A-.
- Release fastening bolts -A- and extract the Ignition switch - D- towards the -arrow- of the steering lock set.



11.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Insert the Ignition switch - D- into the steering lock set.



Note

While installing, make sure the Ignition switch - D- and the key cylinder are at the same position, for example, "ignition on".

- Tighten the fastening screws and seal with sealing paint.
- Connect the multi-pin connector to the Ignition switch - D- .
- Install the turn signal and wiper/washer switch sets ➔ [page 125](#) .



11.3 Ignition switch - D- - pinout

The pinout of the ignition switch - D- is described in the electrical diagrams ➤ Current flow diagrams, Electrical fault finding and Fitting locations



96 – Lights, bulbs, switches - interior

1 Internal lights and switches



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ⇒ [page 1](#).



Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

1.1 Light switch - E1- - remove and install

The light switch is integrated to the switch set ⇒ [page 125](#).

1.2 Dashboard switches - remove and install

The switches must be removed from the instrument panel with the respective cables connected, in order to enable disengaging their respective connectors.

To enable pulling the switch cable sufficiently, you may have to remove the switch beside the cable.

As some equipment items are optional in the vehicle, there might be covers in the place of some of the switches reported here.

These covers may be removed and installed in a similar way as for the switches.

Special tools and workshop equipment required

- ◆ Assembly tool - T 10034-

T10034



W00-0985

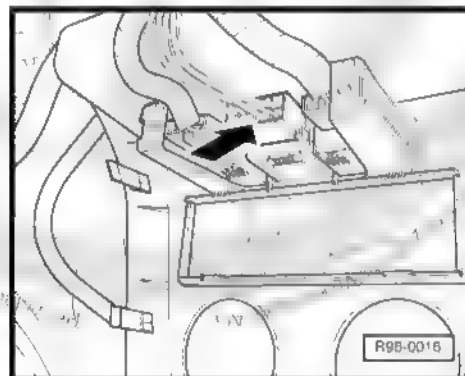
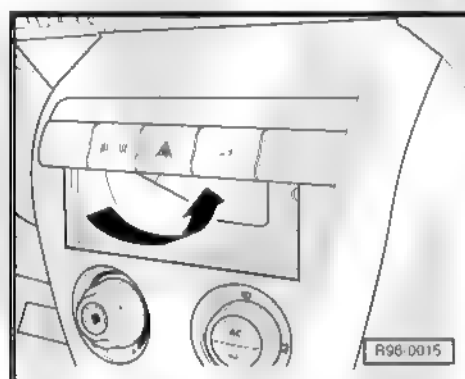


1.2.1 Removal



Note

- ◆ *The switches must be removed from the dashboard with the wiring connected; later, it will be disconnected*
- ◆ *The covers are installed according to each vehicle type, and can be levered carefully from outside with the Spatula - VW 037- , without removing the radio.*
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the radio ⇒ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Insert your hand through the panel opening -arrow-.
- Press out the switches from inside the panel,
- Disconnect the connectors -arrow- and remove the switches.



1.2.2 Installation

Installation is performed in reverse sequence to the removal.



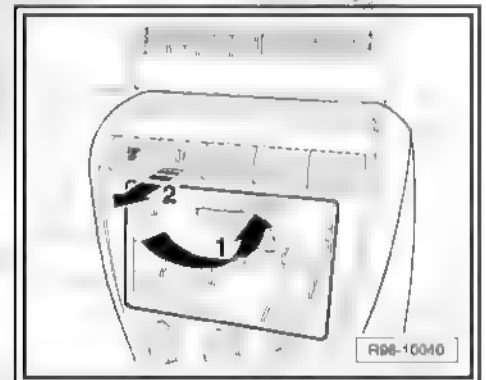
1.3 Switches in dashboard (vehicles - EU) - remove and install

1.3.1 Removal



Note

- ◆ *The switches must be removed from the dashboard with the wiring connected; later, it will be disconnected*
- ◆ *The covers are installed according to each vehicle type, and can be levered carefully from outside with the Spatula - VW 037- , without removing the radio.*
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the radio ➔ Communication; Rep. gr. 91 ; Radio equipment .
- Insert your hand through the radio opening -arrow 1-.
- Press out the switches from inside the panel -arrow 2- .
- Remove the switches and disconnect the connectors.



1.3.2 Installation

Installation is performed in reverse sequence to the removal.

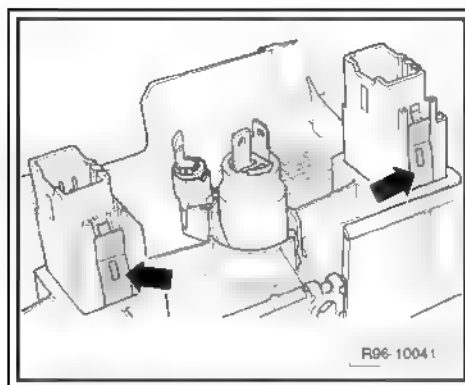
1.4 Seat heating switch E73- (Europe vehicles) - remove and install

1.4.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove centre console ➔ General body repairs, interior; Rep. gr. 68 ; Internal equipment
- Disengage switch connectors
- Remove the screws from the central console frame.



- Press locks -arrow- and remove the Seat heating switch - E73- .



1.4.2 Installation

Installation is performed in reverse sequence to the removal.



2 Front door lights and switches



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#).



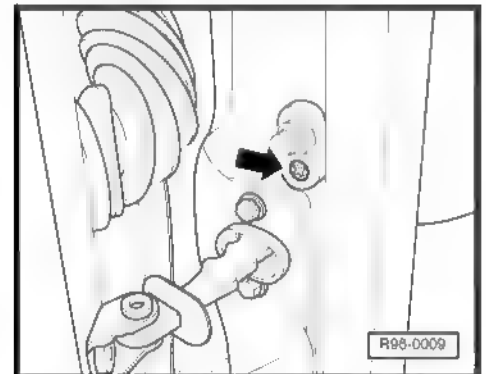
Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

2.1 Front internal lighting switch (door contact) - E459 - remove and install

2.1.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#).
- Remove fastening screw -arrow- on pillar A, and remove the switch.

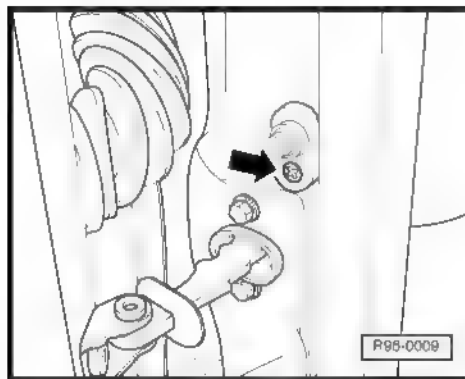


2.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:



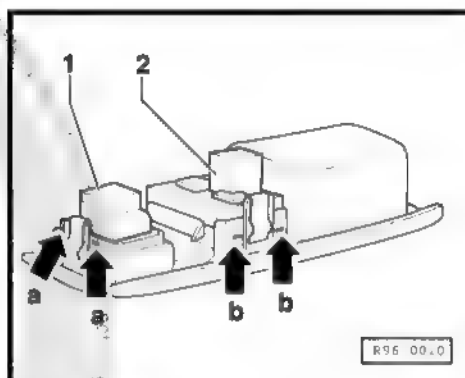
- Tighten the fastening screw -arrow- to (1 + 0.1-Nm) torque.



2.2 Left front power window drive switch - E40- and/or Right front power window drive switch - E41- - remove and install

2.2.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#).
- Remove the switch housing ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Disconnect the connectors -1- and -2-.
- Disengage the switches, pressing their locks -a- and -b- on the sides.



2.2.2 Installation

Installation is performed in reverse sequence to the removal.

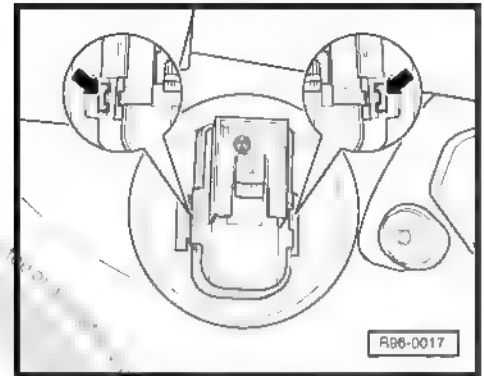
2.3 Rear-view mirror adjustment switch - E43- with Switch for rear-view mirror adjustment - E48- - removal and installation

2.3.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Remove the switch housing ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Disconnect switch connector.



- Disengage the switch by pressing its locks -arrows-, and remove the switch.



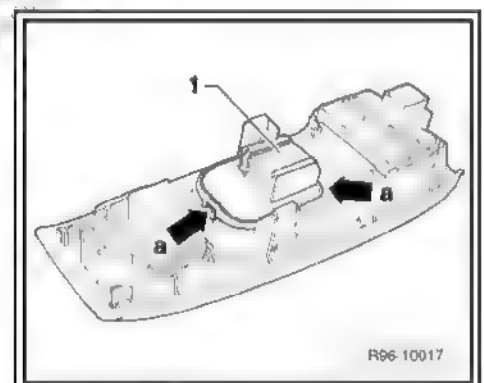
2.3.2 Installation

Installation is performed in reverse sequence to the removal.

2.4 Rear-view mirror adjustment switch - E43- with Switch for rear-view mirror adjustment - E48- (Europe vehicles) - remove and install

2.4.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➤ [page 1](#) .
- Remove the switch housing ➤ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Disconnect the connector -1-.
- Disengage the switch by pressing its locks -a- on the sides, and remove the switch.



2.4.2 Installation

Installation is performed in reverse sequence to the removal.



3 Lights and switches in luggage compartment



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).

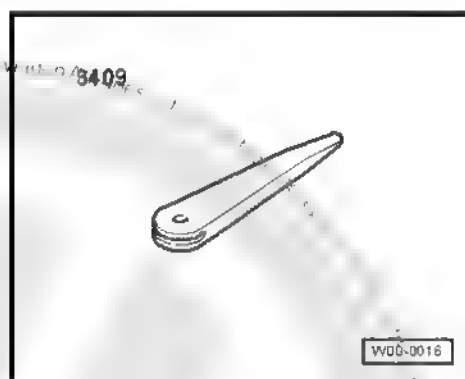


Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Wedge - 3409-



3.1 Luggage compartment lighting switch - F5- - remove and install



Note

The switch is located in the luggage compartment lock, and is only replaced along with the lock.

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#).
- Remove and install the luggage compartment lock ⇒ General body repairs, exterior; Rep. gr. 55 ; Lids.

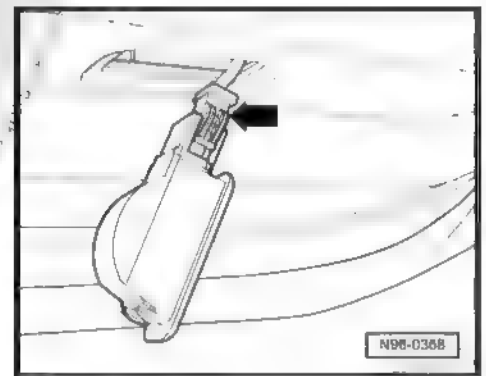
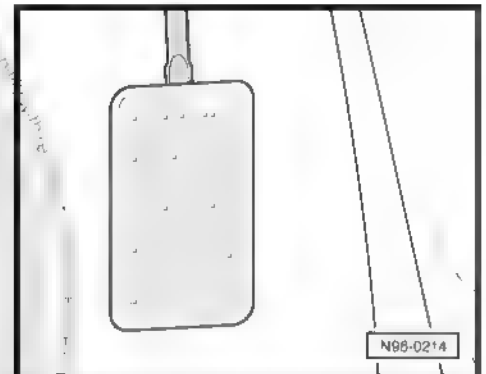


3.2 Luggage compartment lighting - remove and install

3.2.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Carefully disengage the luggage compartment lighting by using the Wedge - 3409- or a screwdriver from behind the diffuser lens.

Disengage the connector -arrow- and remove the luggage compartment lighting.

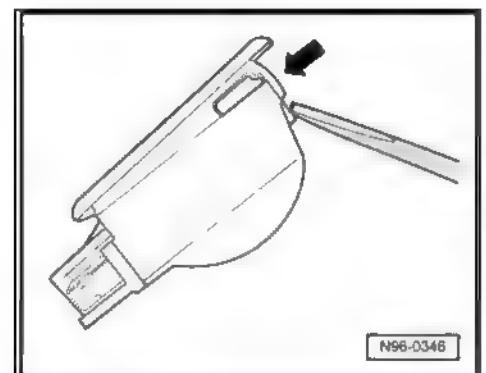


3.2.2 Installation

Installation is performed in reverse sequence to the removal.

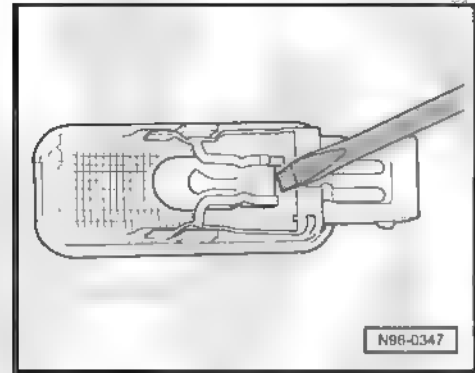
3.3 Luggage Compartment lighting fixture - W3- - replace

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Remove the luggage compartment lighting fixture ➔ [page 141](#) .
- Release the lock -arrow- with a screwdriver and remove the cover from the Luggage compartment lighting - W3- .





- Remove the Luggage compartment lighting fixture - W3- with a screwdriver, and remove the lamp -2-.
- Replace the lamp in the Boot lighting - W3 (12V - 5W).





4 Roof lining lights and switches



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery -> [page 1](#).

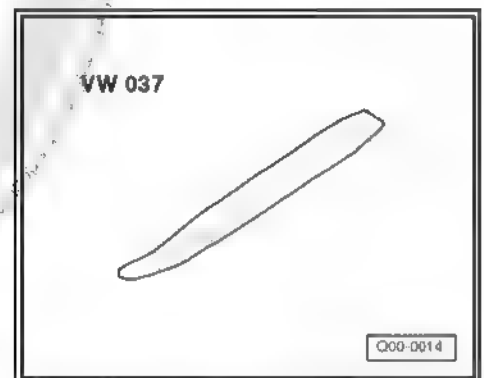


Note

- ◆ Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).
- ◆ Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Spatula - VW 037-



4.1 Internal front light - W1-



Note

To replace the Internal front light. - W1-, remove the internal light diffuser lens only.

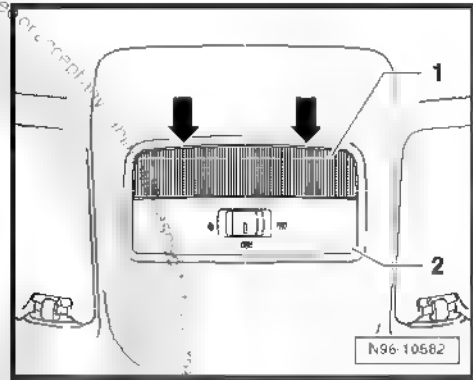
4.1.1 Internal front light - W1- - remove and install

Removal:

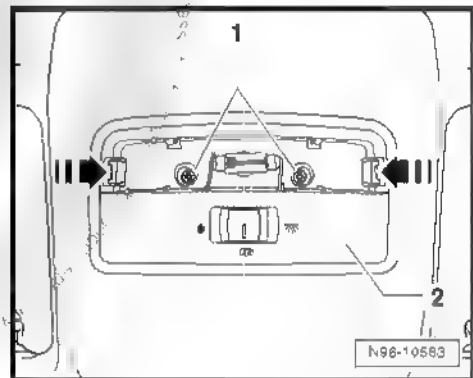
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- -> [page 1](#).



- Carefully insert the **Scraper - VW 037-** in the locations -arrows- and disengage the diffuser lens -1-, pulling it out of the Front internal light - W1- -2-.



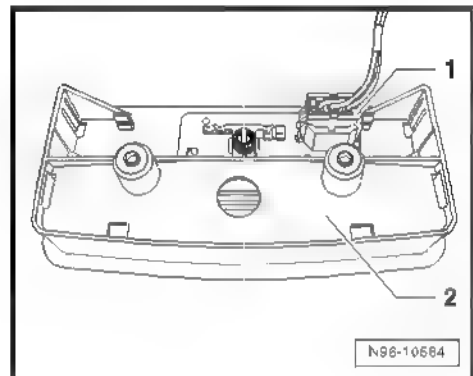
- Loosen the fastening screws -1- and unlock the locks in the direction of movement -arrows- of the Front internal light - W1- -2-.



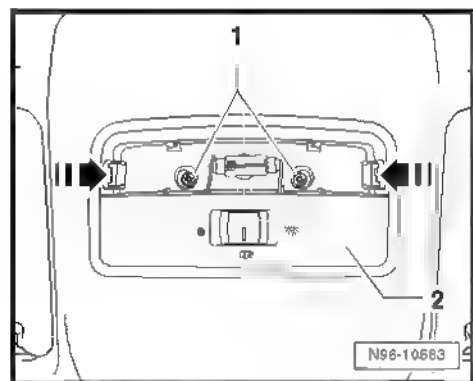
- Disconnect the connector -1- and remove the Front internal light - W1- -2-.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:



- Tighten fastening screws -1- to (1.5 Nm) torque.



4.1.2 Internal front light - W1- - replace lamp

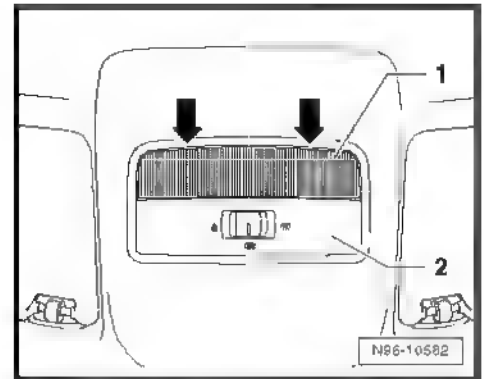


Note

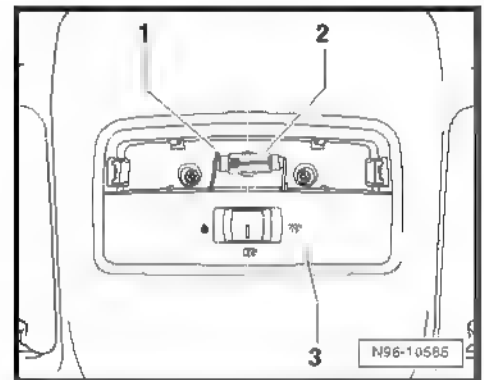
To replace the Internal front light. - W1- , remove the internal light diffuser lens only.



- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Carefully insert the Spatula - VW 037- in the location -arrows- and disengage the diffuser lens -1- by pulling it out of the Front internal light - W1- -2-.



- Move the contact blade -1- and remove the lamp (K12V, 10W) -2- from the Front internal light - W1- -3-.
- Install a new light, and check functioning.



4.2 Front internal light - W1- with reading light

The Front internal light - W1- comprises the following components:

- ◆ Driver's side reading light - W19- .
- ◆ Passenger's side reading light - W13- .
- ◆ Ultra-sound sensor for alarm system - G209- .



Note

To replace the Internal front light. - W1- , remove the internal light diffuser lens only.

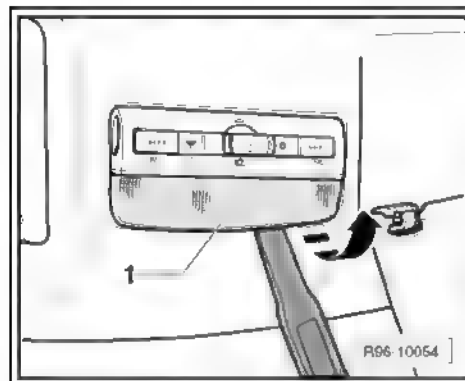
4.2.1 Front internal light - W1- with reading light - remove and install

Removal:

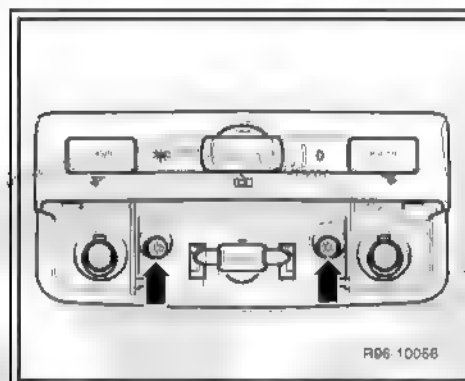
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .



- Remove light lens -1- towards -arrow- with the Scraper - VW 037- .



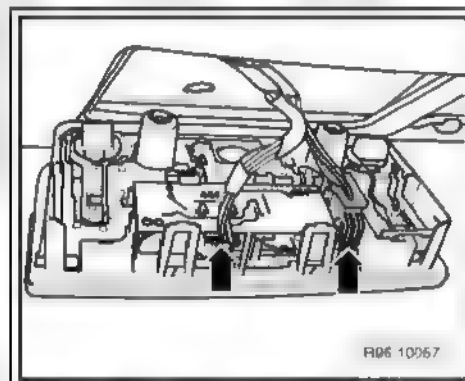
- Loosen and remove fastening screws -arrows- from the internal lighting fixture.



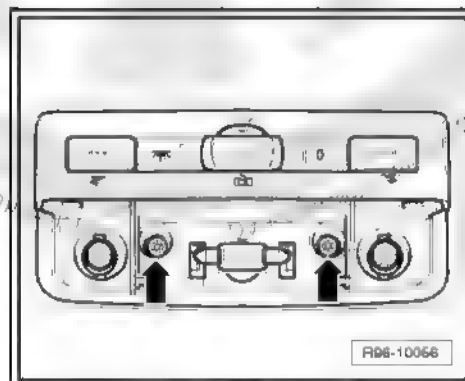
- Release the connectors -arrows- and remove the interior lighting fixture from the roof lining.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:



- Tighten fastening screws -arrows- to (1.5 Nm) torque.

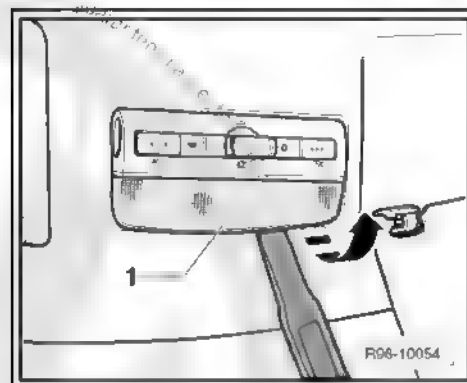


4.2.2 Front internal light - W1- with reading light - replace lamp

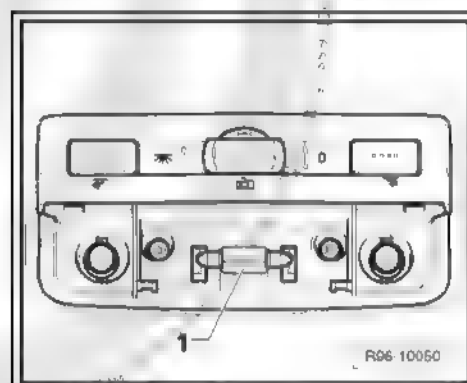
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#) .



- Remove light lens -1- towards -arrow- with the Scraper - VW 037- .

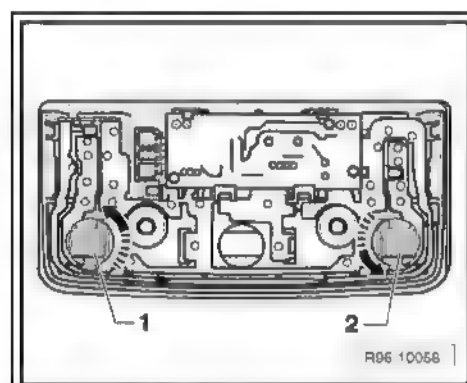


- Replace the lamp -1- (C5W - 12V, 10W).
- Install a new light and check functioning.

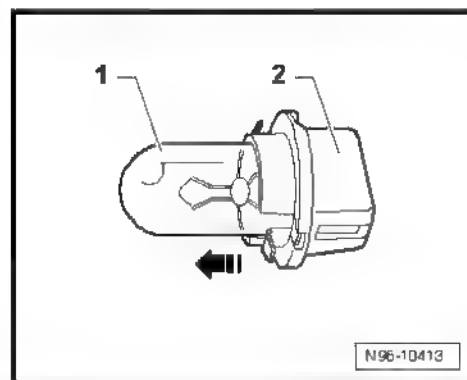


4.2.3 Left centre reading light - W39- and/or Right centre reading light - W40- with reading light - replace lamp

- Remove the internal lighting fixture ➔ [page 145](#) .
- Turn the socket -1- and/or -2- with the Left centre reading light - W39- and/or Right centre reading light - W40- towards -arrows-.

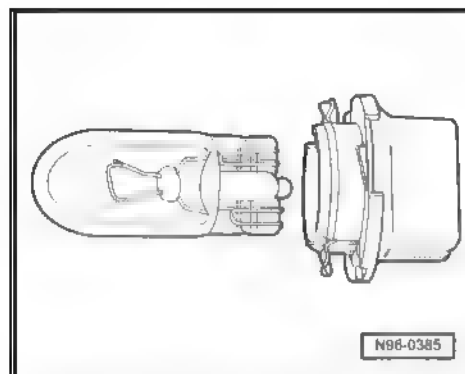


- Remove the Driver's side reading lamp - W19- and/or Passenger's side reading lamp - W13- -1- (W5W - 12V, 5W) towards the -arrow- from their respective sockets -2-.





- Replace the lamp (W5W - 12V, 5W).



4.3 Front internal light - W1- with sunroof (Europe vehicles)

The Front internal light - W1- comprises the following components:

- ◆ Driver's side reading light - W19- .
- ◆ Passenger's side reading light - W13- .
- ◆ Sunroof sliding adjustment - E139- .
- ◆ Ultra-sound sensor for alarm system - G209- .



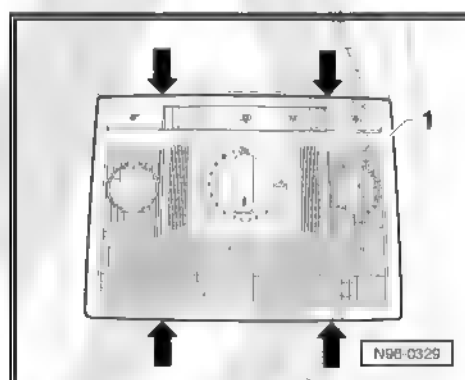
Note

To replace the Internal front light. - W1- , remove the internal light diffuser lens only.

4.3.1 Front internal light - W1- with sunroof (Europe vehicles) - remove and install

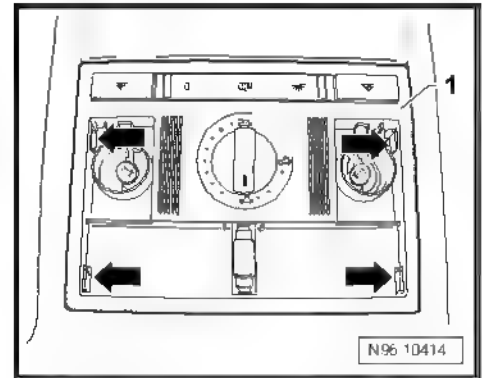
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Carefully lever the internal light -1- using the Spatula - VW 037- to outside the roof lining -arrows-.





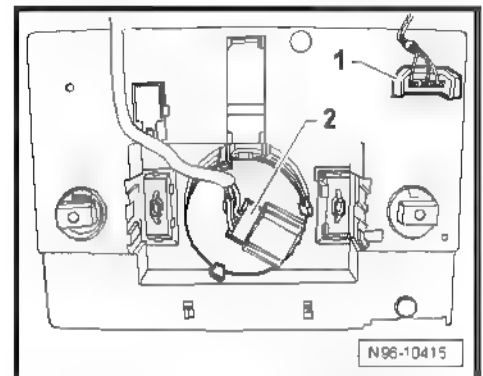
- Release the coupling projections -arrows- and remove the internal and reading light -1- from the roof lining, until permitted by the harness length



- Disconnect connector -1- for the Front internal light - W1- , and connector -2- for the Sunroof sliding adjustment - E139- .

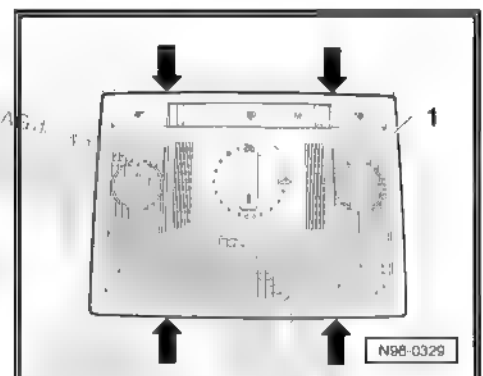
Installation:

Installation is performed in reverse sequence to the removal.

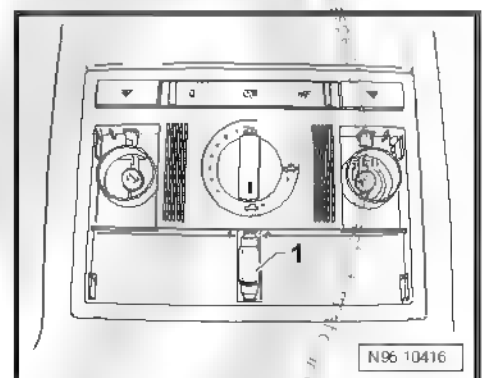


4.3.2 Front internal light - W1- with sunroof (Europe vehicles) - replace lamp

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Carefully lever the internal light -1- using the Spatula - VW 037- to outside the roof lining -arrows-.



- Remove the lamp (C5W - 12V , 10W) -1- from the Front internal light - W1- .
- Install a new lamp, and check functioning

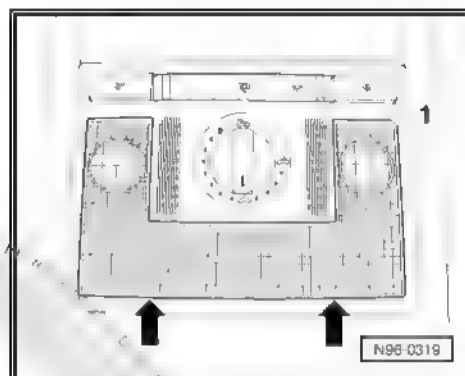


4.3.3 Driver's side reading light - W19- and/or Passenger's side reading light - W13-

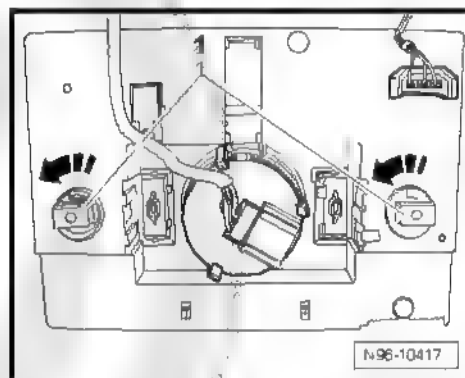


with sunroof (Europe vehicles) - replace lamps

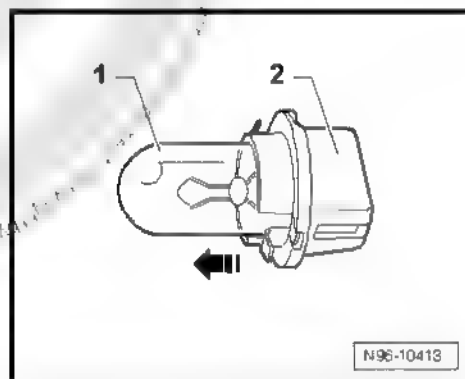
- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the internal front light - W1- ➔ [page 148](#) .
- Remove the diffuser cover -1- from the internal light -arrows-.



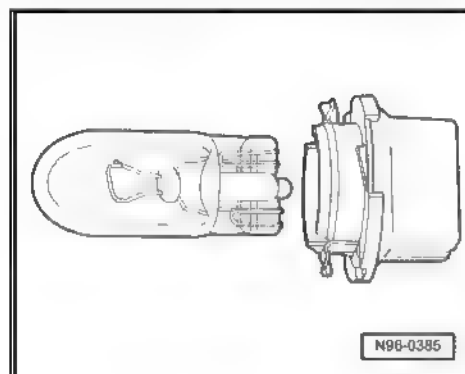
- Turn the sockets -1- with the reading light lamp towards the -arrow-, and remove them from the Front internal light - W1- assembly.



- Remove the Driver's side reading lamp - W19- and/or Passenger's side reading lamp - W13- -1- (W5W - 12V, 5W) towards the -arrow- from their respective sockets -2-.



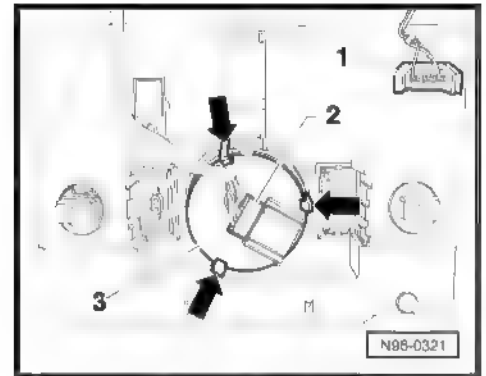
- Replace the lamp (W5W - 12V, 5W).
- Install a new light, and check functioning





4.3.4 Sunroof sliding adjustment - E139- (Europe vehicles) - remove and install

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Remove the Internal front light - W1- ➔ [page 148](#)
- Disconnect the connector -1- and the connector -2- for the Sunroof sliding adjustment - E139- .
- Release the locks -arrows- and pull out the Sunroof sliding adjustment - E139- -3- from its housing.



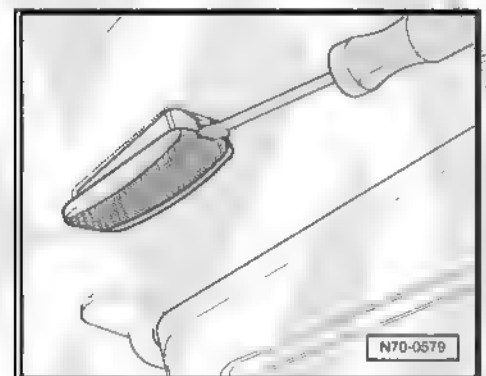
4.4 Make-up mirror lighting - remove and install

4.4.1 Removal



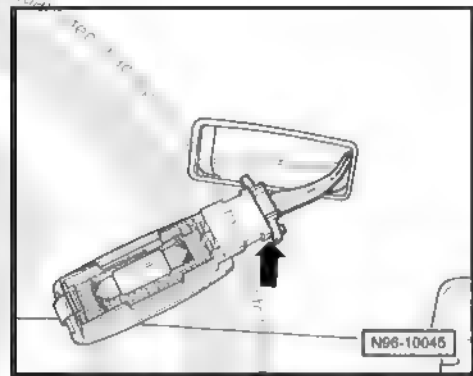
Note

- ◆ *When removing and installing visible components (switches, covers, linings, etc.), protect the zones where tools are applied to function as levers.*
- ◆ *Disassembling/assembling of both lamps is identical; the description refers to only one side.*
- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Carefully raise the lighting fixture with a Wedge - 3409- or a screwdriver, and remove it from the roof lining.





- Disengage the connector -arrow-.
- Remove the lighting fixture from the make-up mirror.

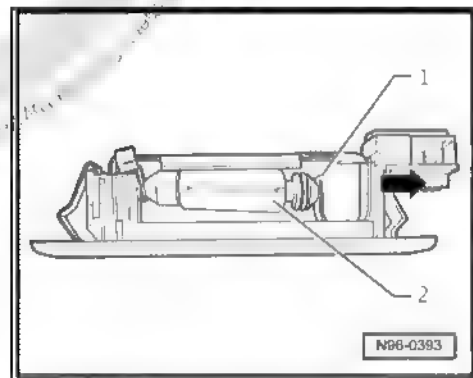


4.4.2 Installation

Installation is performed in reverse sequence to the removal.

4.4.3 Make-up mirror lighting lamp - L31- - replace

- Remove the lighting fixture from the make-up mirror
⇒ [page 151](#) .
- Move the contact blade -1- towards -arrow- and remove the Vanity mirror lighting lamp - L31- -2- from the housing.
- Replace the Vanity mirror lighting lamp - L31- -2- (12V - 5W).





5 Horns



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery → [page 1](#).



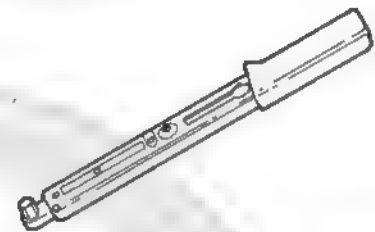
Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (fit. 1/2") - VAG 1331-

V.A.G 1331

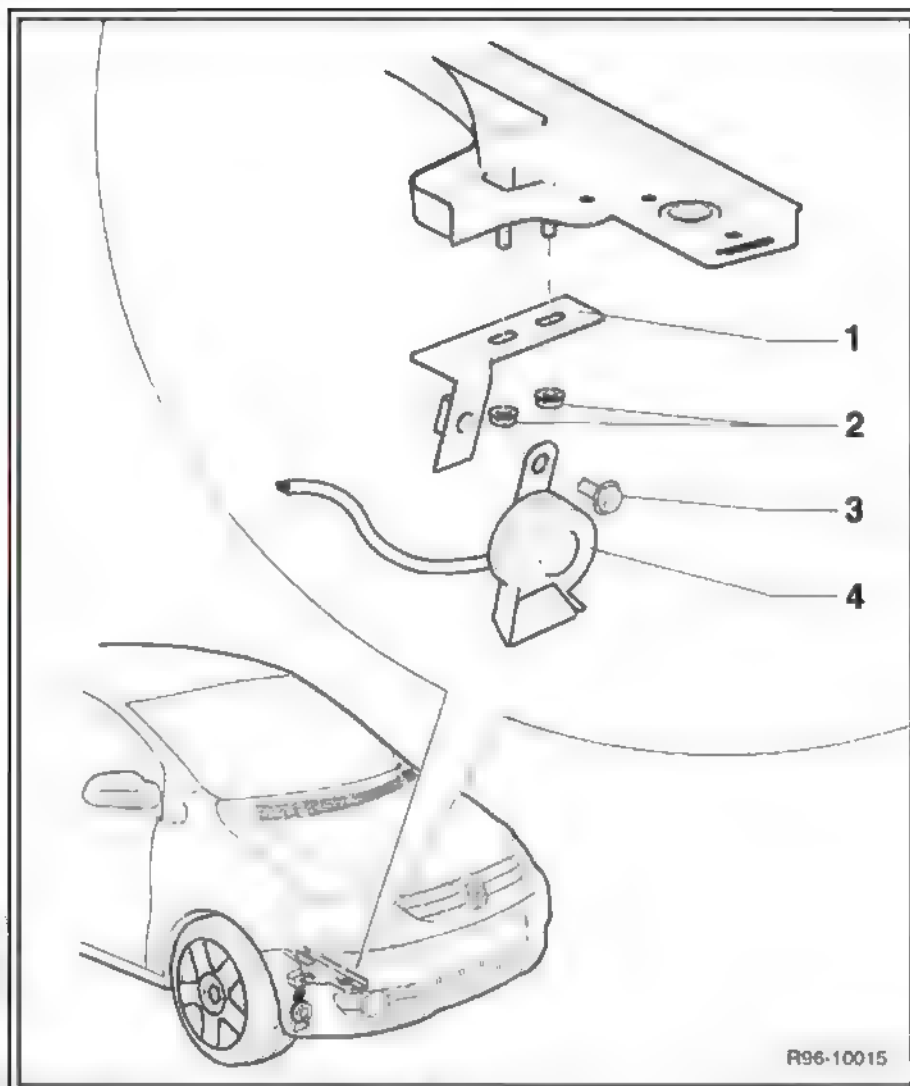


Q00-10065

5.1 Treble tone horn - H2- - assembly overview



- 1 - Fastening support
- 2 - Hexagonal nuts
 - 11 ± 2 Nm.
- 3 - Screw
 - 15 ± 2 Nm.
- 4 - Treble tone horn - H2-
 - Remove and install
⇒ [page 154](#) .



5.1.1 Treble tone horn - H2- - remove and install

Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .

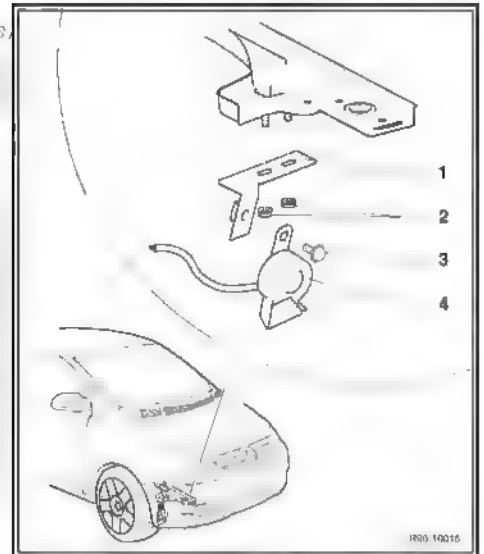


- Disengage the Treble tone horn - H2- connector -4-
- Loosen fastening nuts -2- and remove Treble tone horn - H2- with its support.

Installation:

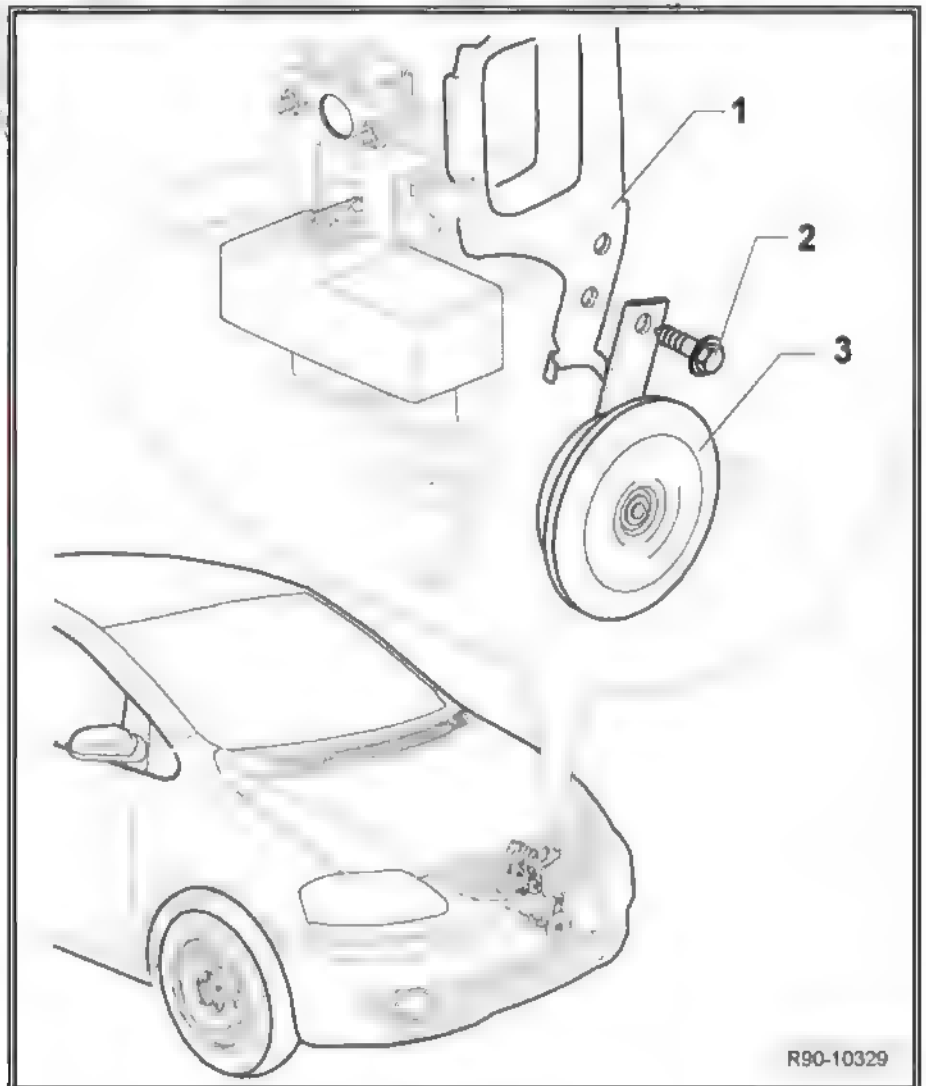
Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening nuts -2- to $(11 \pm 2 \text{ Nm})$.



5.2 Treble tone horn - H2- (Europe vehicles) - assembly general view

- 1 - Body
- 2 - Screw
 - ☐ $16 \pm 2 \text{ Nm}$.
- 3 - Treble tone horn - H2-
 - ☐ Europe vehicles.
 - ☐ Remove and install
⇒ [page 156](#).





5.2.1 Treble tone horn - H2- (Europe vehicles) - remove and install

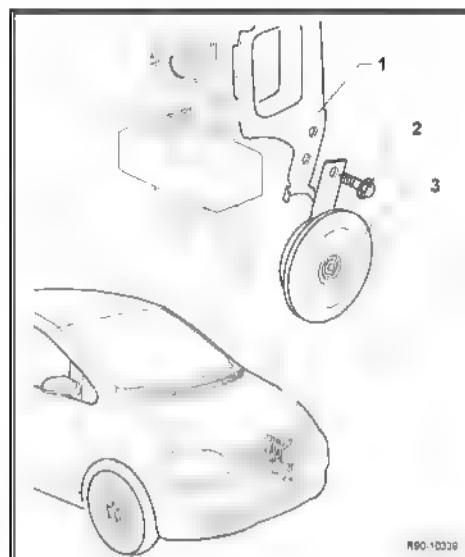
Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Disengage the Treble tone horn - H2- connector -3-.
- Loosen fastening screw -2- and remove the Treble tone horn - H2- with its support.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening bolt -2- to a torque of $(16 \pm 2 \text{ Nm})$.



5.3 Horn actuator - H-

The horn activation occurs through the plastic cover located in the centre of the steering wheel. Depending on the equipment, the horn activation devices integrated to the steering wheel or to the Igniter for driver's airbag - N95- cannot be replaced individually:

In vehicles with airbag, replace the Igniter for driver's airbag - N95- ➔ Body - Internal assembly works; Rep. gr. 69 ; Passenger protection .

On vehicles without airbag, replace the Horn drive - H- ➔ Chassis, axles, steering; Rep. gr. 48 ; Steering .

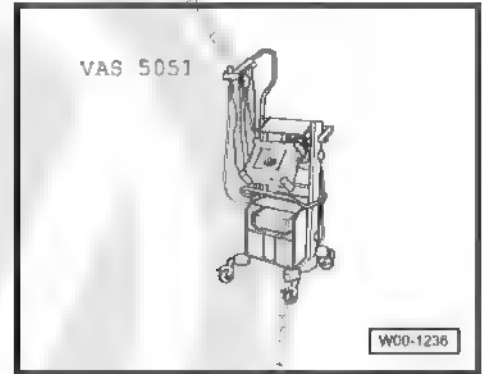


6 Immobilizer

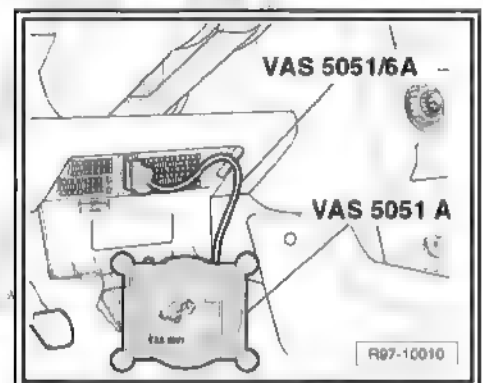
The immobilizer is equipped with self-diagnosis function, which facilitates troubleshooting.

Locating defects and indicating faults:

For troubleshooting, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment.



- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment ➔ General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .
- Turn on the ignition.
- Turn off all electrical devices.
- Proceed by selecting the desired functions ➔ Vehicle diagnostic tester.



6.1 Immobilizer control unit - J362- (IMMO 3) for Europe vehicles - remove and install



Note

The Immobilizer control unit - J362- -J362- is integrated to the Combined instrument - K- for Europe vehicles. If the Immobilizer control unit - J362- is damaged, replace the entire Combined instrument - K- .

- Replace the Combined instrument - K- ➔ [page 58](#) .

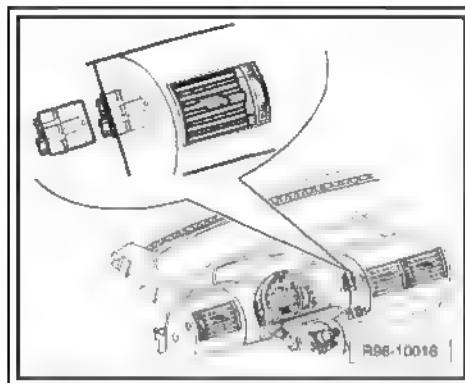
6.2 Immobilizer control unit - J362- (IMMO 2) - remove and install

6.2.1 Removal

- Remove the instrument panel's cover ➔ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .



- Release the connector from the Immobilizer control unit - J362- , and unlock it to remove



6.2.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:



Note

When replacing the Immobilizer control unit - J362- , perform all the adaptations and coding with the control units.

6.3 Immobilizer reading coil - D2- - remove and install

The Immobilizer reading coil - D2- is installed in the key cylinder, and cannot be replaced individually.

- If the Immobilizer reading coil - D2- is damaged, the key cylinder must be replaced ⇒ [page 129](#) .

6.4 Ignition key - variable code transponder



Note

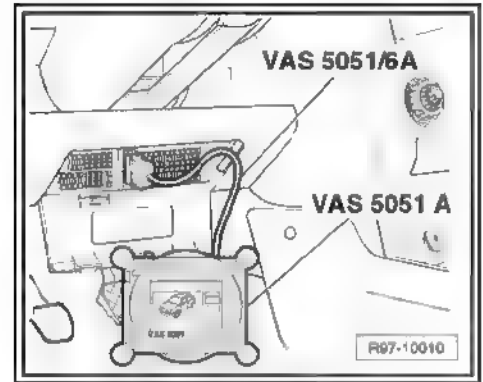
- ◆ *It is not possible to replace the variable code transponder from the ignition key.*
- ◆ *If the variable code transponder is damaged, the ignition key must be replaced.*
- ◆ *In case of replacing an ignition key or if an additional key is necessary, always adapt the new ignition key to the immobilizer ⇒ [page 158](#) .*

6.5 Ignition key adapt to immobilizer

To adapt the ignition key to the immobilizer, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment.



- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment → General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .
- Turn on the ignition.
- Turn off all electrical devices
- Proceed by selecting the desired functions → Vehicle diagnostic tester.



6.6 Ignition key - replace battery

Replacing the battery on the ignition key with remote command
⇒ General body repairs, exterior; Rep. gr. 57 ; Front doors/ components/ central lock .



7 Alarm System

General description:

The anti-theft alarm system functions are integrated to the Central control unit for convenience system - J393-.

When the Central control unit for the convenience system - J393- is damaged or defective, replace it ⇒ General body repairs, exterior; Rep. gr. 57 ; Front doors/ components/ central lock .

It is crucial to know how the alarm systems operate and are handled ⇒ Vehicle's instruction manual .

The anti-theft alarm system is equipped with self-diagnosis, which facilitates troubleshooting ⇒ [page 160](#) .

7.1 Locating defects and indicating faults

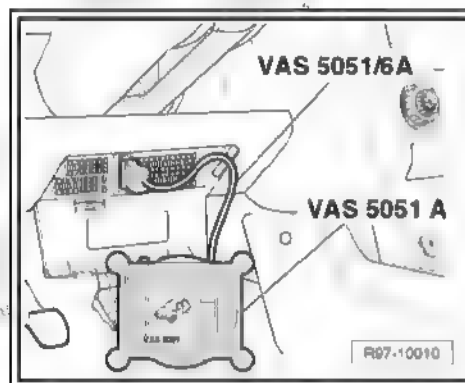
For fault location, use the Vehicle diagnostic, testing and information system - VAS 5051- or Vehicle diagnostic, testing and information system - VAS 5052- or later equipment.

- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment ⇒ General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector, - T16- .
- Turn on the ignition.
- Turn off all electrical devices.
- Proceed by selecting the desired functions ⇒ Vehicle diagnostic tester.



Note

After triggering the anti-theft alarm system, it is possible to check for the alarm source memorized in the Central control unit for the convenience system - J393- .



7.2 Anti-theft alarm system - activate and deactivate

Activate the anti-theft alarm system:

The anti-theft alarm system turns on automatically when the vehicle is locked.



Note

Before locking the vehicle, you must close completely all windows and doors, in order to prevent unnecessary alarm triggering. However, this is not necessary in vehicles with one-touch closing.

Deactivate the anti-theft alarm system through the manual command:

- ◆ The anti-theft alarm system deactivates if the vehicle is unlocked through activation of the unlocking key, or when the ignition is turned on.

Open the vehicle with key (emergency opening - version 1):

- Turn the key in the driver's door lock to the opening position.



- Open only the driver's door.



Note

Therefore, you must not open any other door, bonnet or rear lid; otherwise, the alarm will be triggered

However, the anti-theft alarm system remains activated, but there is no alarm triggering.

- Turn the ignition on within 15 seconds.

After 15 seconds, the alarm will be triggered if the ignition is not turned on.

When the ignition is turned on, the electronic system recognizes the valid ignition key and deactivates the anti-theft alarm system.

Open the vehicle with key (emergency opening - version 2):

- Turn the key in the driver's door lock to the opening position.
- Open driver's door.

The anti-theft alarm system will immediately trigger the horn.

- Turn on the ignition.

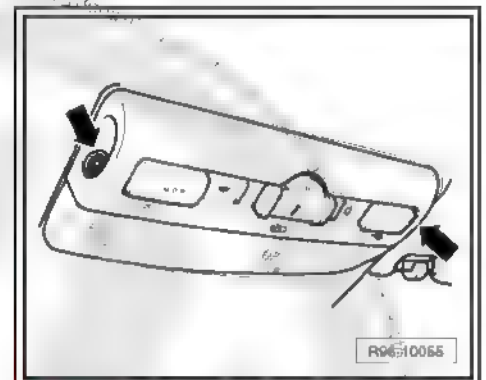
When the ignition is turned on, the electronic system recognizes the valid ignition key and deactivates the anti-theft alarm system.

7.3 Ultra-sound sensor for alarm system - G209- - remove and install

7.3.1 Vehicles with Front internal light - W1- with reading light - remove and install

The Ultra-sound sensor for alarm system - G209- is comprised of 2 individual sensors -arrows- , cables and a command element in the rear section of the interior front light, and cannot be replaced individually. The Ultra-sound sensor for the alarm system - G209- must only be replaced together with the complete assembly.

- Remove and install the interior front light ➔ [page 145](#) .



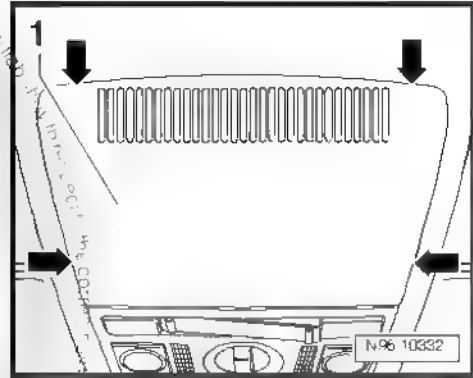
7.3.2 Vehicles with Front internal light - W1- with sunroof (Europe vehicles) - remove and install

Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .



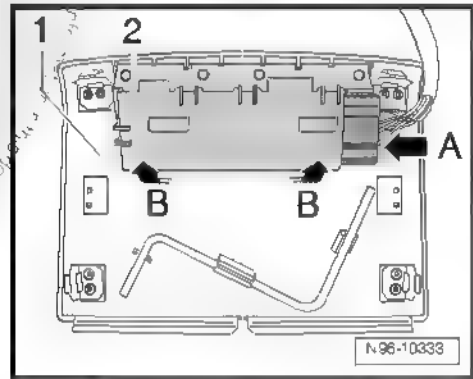
- Remove lining -1- with Spatula - VW 037- from the respective fittings -arrows-.



- Disconnect the connector -arrow A- from the Ultra-sound sensor for alarm system - G209- -2-.
- Move the Ultrasound sensor for alarm system - G209- assembly-2- towards - arrow B- and remove it from the lining -1-.

Installation:

Installation is performed in reverse sequence to the removal.



7.4 Alarm system horn - H8- (vehicles with mechanical steering) - assembly overview

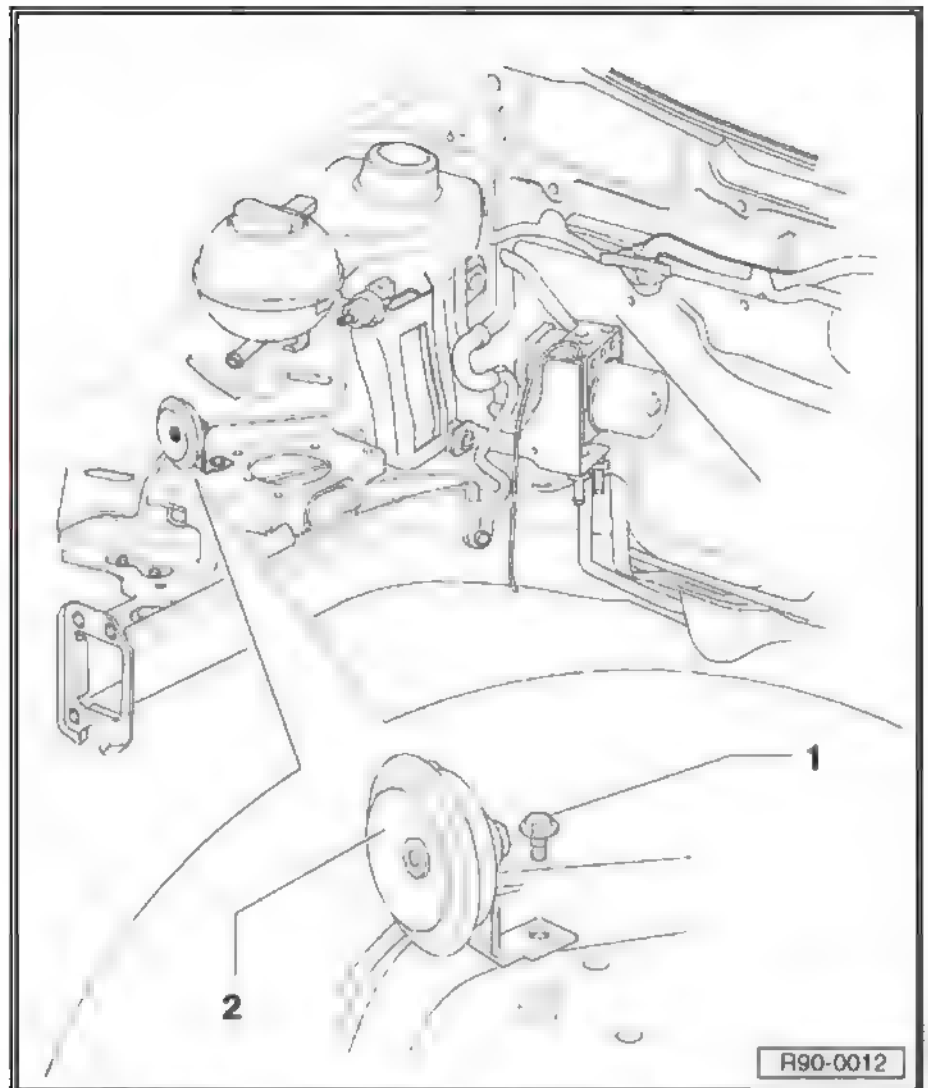


1 - Screw

- 20 Nm

2 - Alarm system horn - H8-

- For vehicles with mechanical steering
- Remove and install
➤ [page 163](#).



7.4.1 Alarm system horn - H8- (vehicles with mechanical steering) - remove and install

Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➤ [page 1](#)
- Disconnect the Alarm system horn - H8- connector.

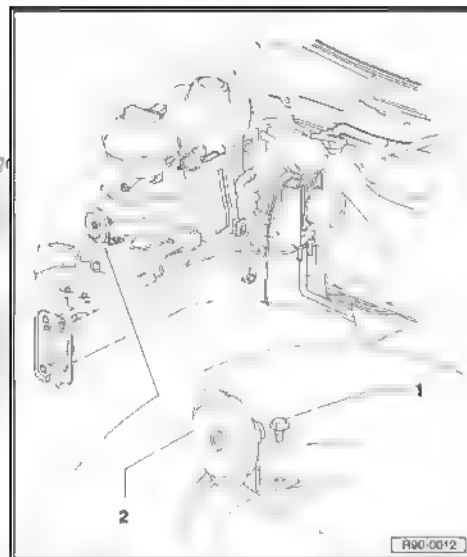


- Loosen the fastening screw-1- (20 Nm) and remove the Alarm system horn - H8- -2-

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Screw on the fastening screw -1- with torque of (20 Nm).



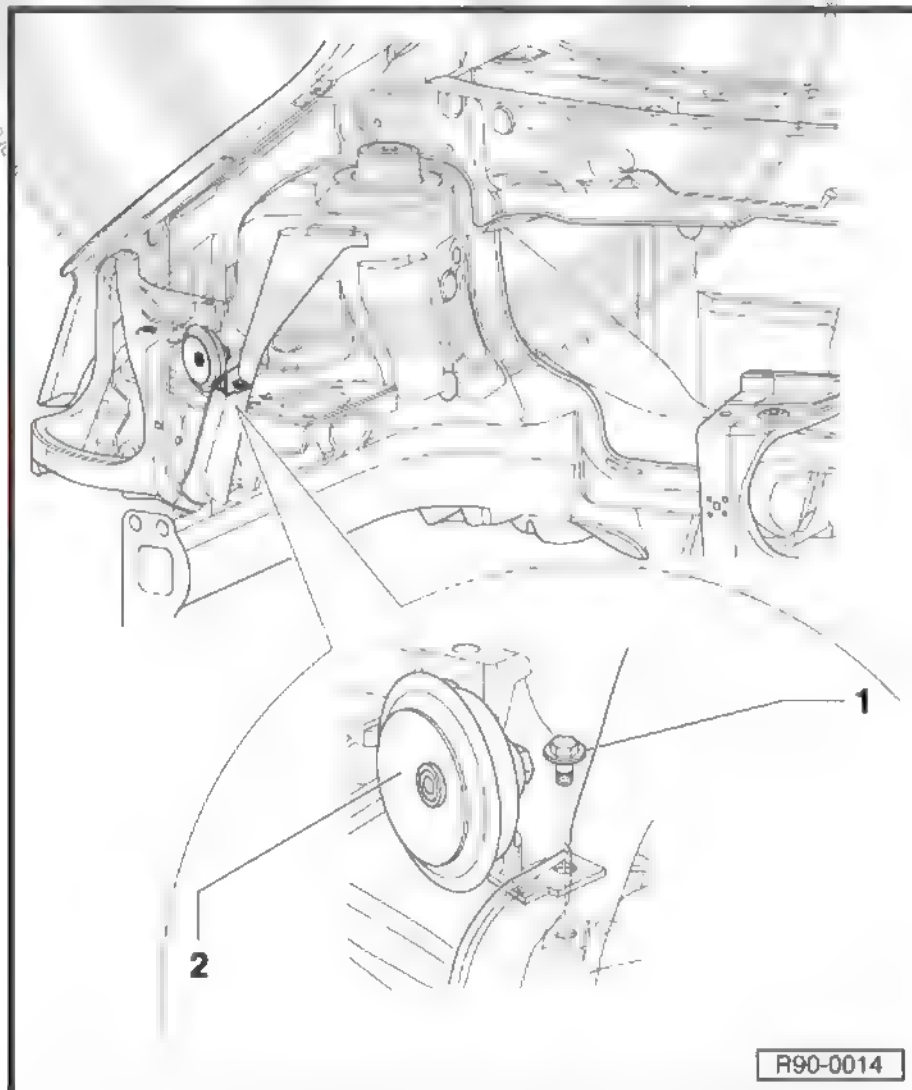
7.5 Alarm system horn - H8- (vehicles with power steering) - assembly overview

1 - Screw

- 20 Nm.

2 - Alarm system horn - H8-

- For vehicles with power steering.
- Remove and install
⇒ [page 165](#) .





7.5.1 Alarm system horn - H8- (vehicles with power steering) - remove and install

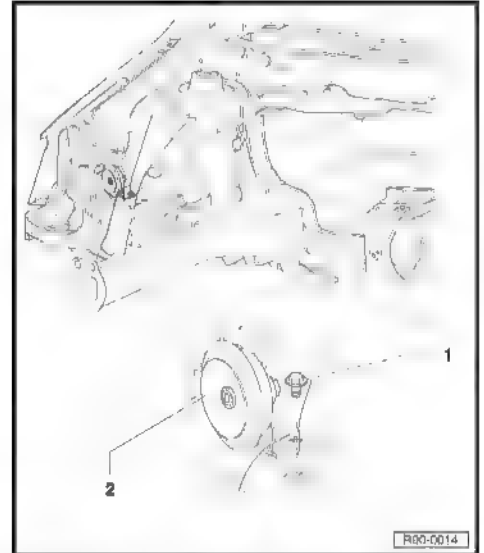
Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Disconnect the Alarm system horn - H8- connector.
- Loosen the fastening screw-1- (20 Nm) and remove the Alarm system horn - H8- -2-.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Screw on the fastening screw -1- with torque of (20 Nm).



7.6 Alarm system horn - H8- (Diesel vehicles) assembly overview





1 - Hexagonal nut

□ 20 ± 2 Nm.

2 - Alarm system horn - H8-

□ For vehicles with diesel engine.

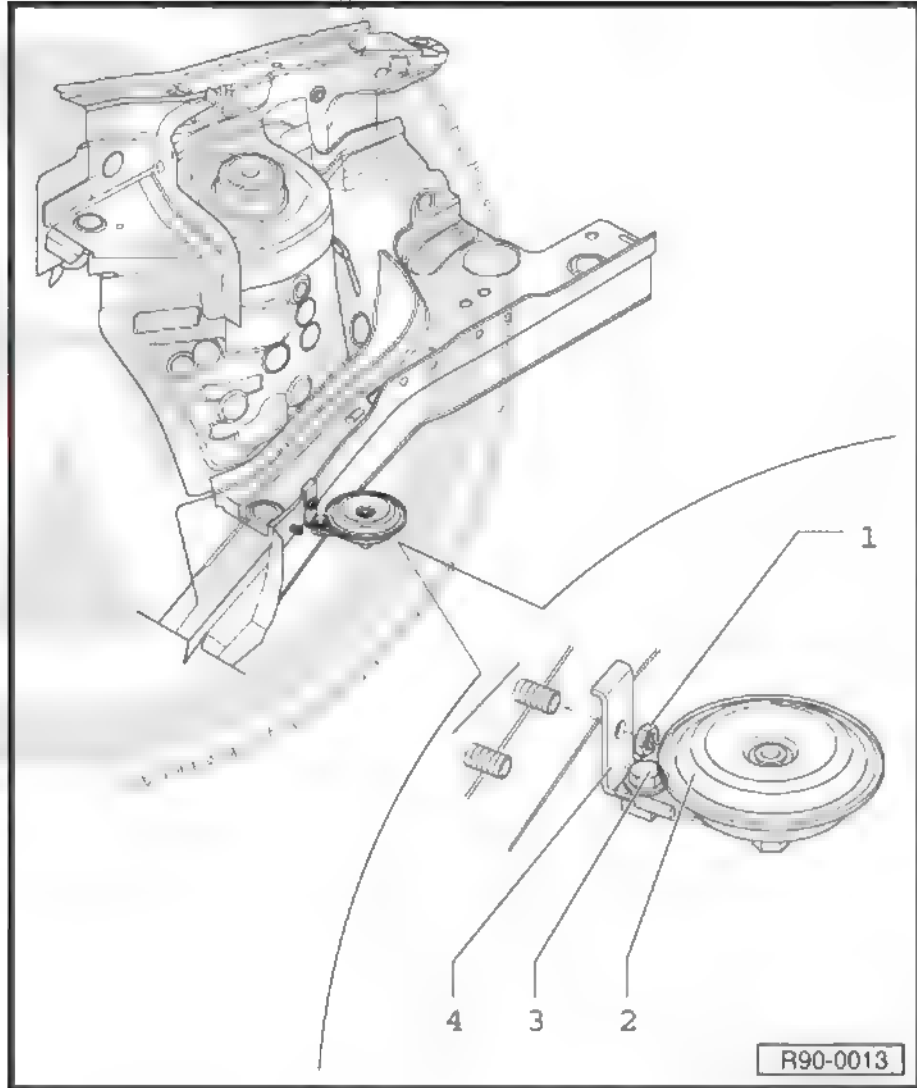
□ Remove and install

→ [page 166](#) .

3 - Screw

□ 20 ± 2 Nm.

4 - Fastening support



7.6.1 Alarm system horn - H8- (Diesel vehicles) - remove and install

Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- → [page 1](#) .
- Disconnect the Alarm system horn - H8- connector.

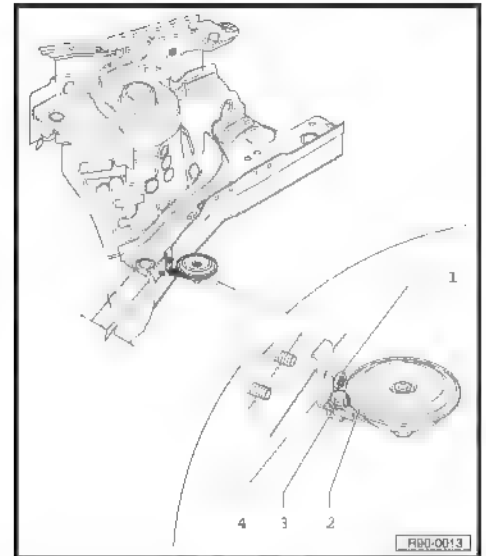


- Loosen the fastening nut-1- and remove the Alarm system horn - H8- -2-with the fastening support -4-.

Installation:

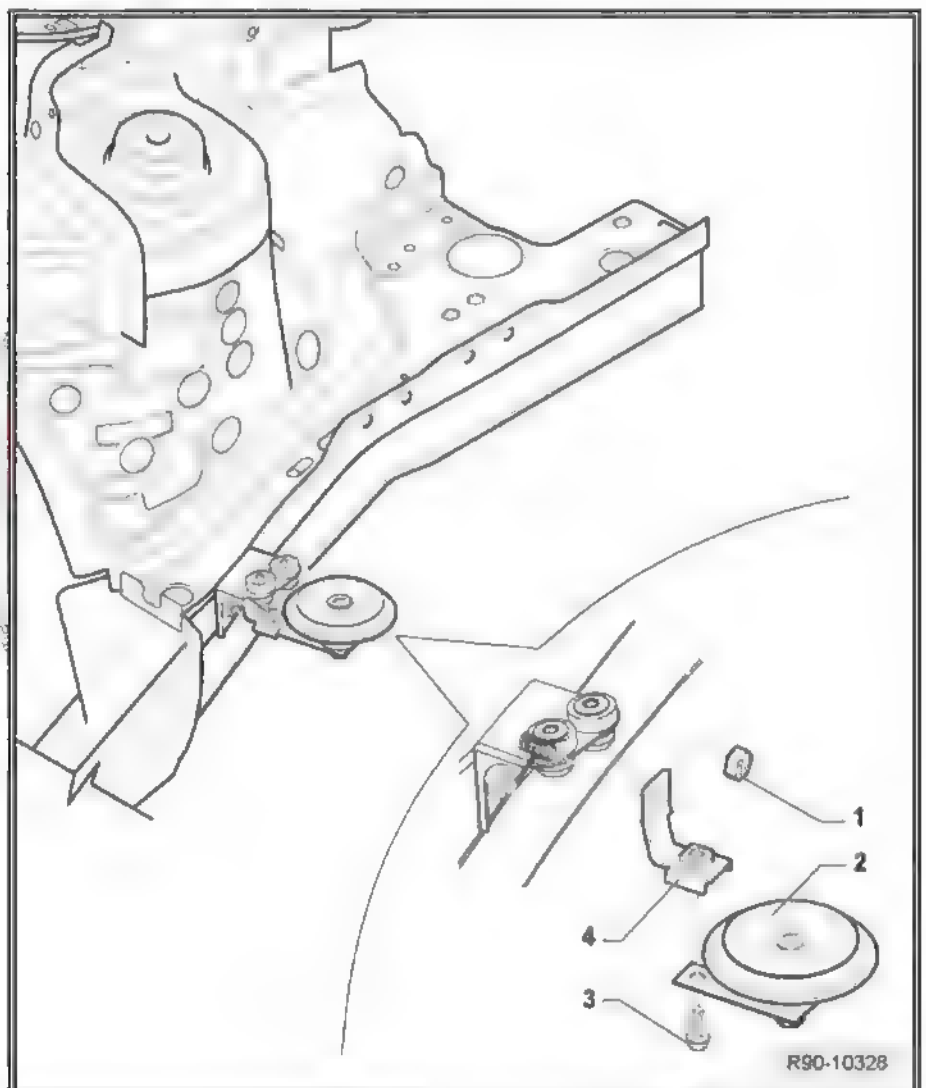
Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening nut -1- to a torque of $(20 \pm 2 \text{ Nm})$.



7.7 Alarm system horn - H8- (Diesel vehicles with right-hand steering wheel) - assembly general view

- 1 - Hexagonal nut
 - $16 \pm 1.6 \text{ Nm}$.
- 2 - Alarm system horn - H8-
 - For vehicles with diesel engines and right-hand steering wheel.
 - Remove and install
⇒ [page 168](#).
- 3 - Screw
 - $16 \pm 1.6 \text{ Nm}$.
- 4 - Fastening support





7.7.1 Alarm system horn - H8- (Diesel vehicles with right-hand steering wheel) - assembly general view

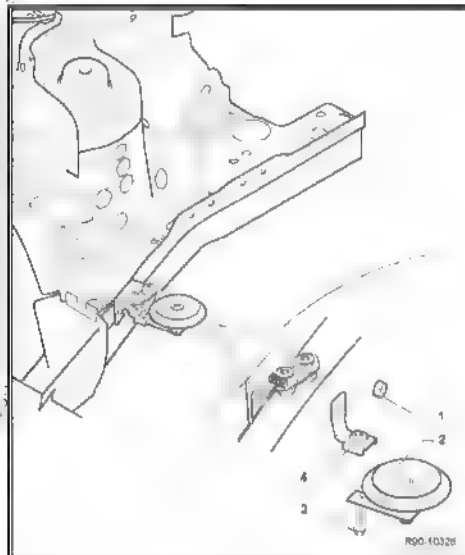
Removal:

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Disconnect the Alarm system horn - H8- connector.
- Loosen the fastening nut-1- and remove the Alarm system horn - H8- -2- with the fastening support -4-.

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten the fastening nut -1- to a torque of $(16 \pm 1.6 \text{ Nm})$.





97 – Wiring

1 Fuse and relay support



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#) .



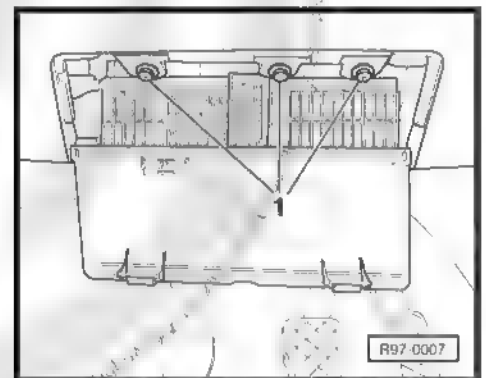
Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A- .*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

1.1 Fuse and relay support - remove and install

1.1.1 Removal

- Turn the ignition and all electric consumers off, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the screws -1- that fasten the fuse support to the panel.
- Remove the support by pushing it into the panel.



1.1.2 Installation

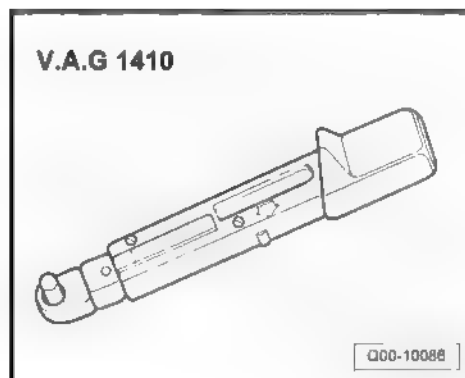
Installation is performed in reverse sequence to the removal.



2 Coupling stations and multi-pin connector

Special tools and workshop equipment required

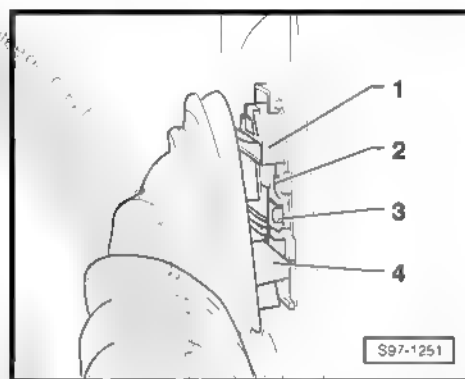
- ◆ Torque wrench - 40 to 20Nm (enc. 3/8") - VAG 1410-



2.1 Coupling station - A pillar

The coupling station is located near the upper door hinge on the A-pillar.

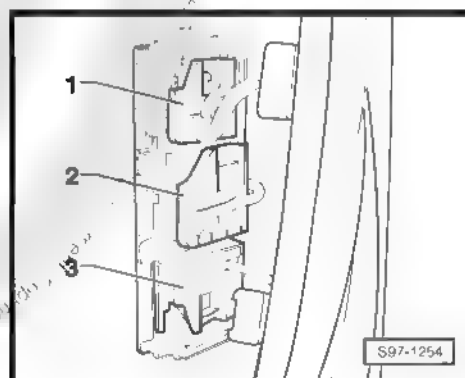
- 1 - Voltage supply to loudspeaker
- 2 - Mirror - CAN-BUS
- 3 - Door contact, alert lights
- 4 - Central locking



2.2 Coupling station - B pillar

The coupling station is located near the upper door hinge on the B-pillar.

- 1 - Voltage supply to loudspeaker
- 2 - Door contact, alert lights
- 3 - Central locking



2.3 Multi-pin connector in the fire wall

General description:

The multi-pin connector integrates the on-board network in the engine compartment with the on-board network in the cabin. It is located at the left side behind the dashboard, and behind the windscreen wiper motor.

Pin assignment ► Current flow diagrams, Electrical fault finding and Fitting locations.



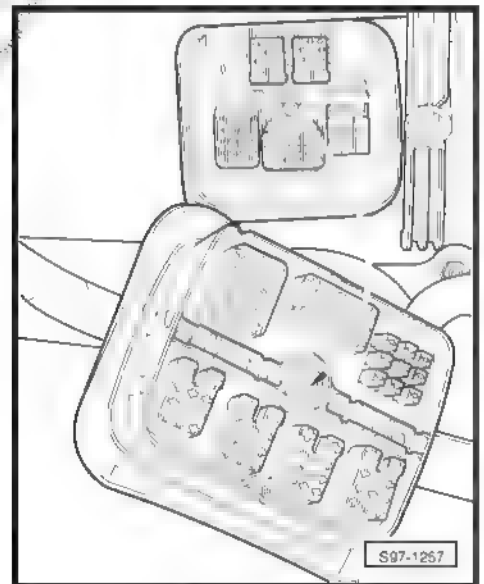
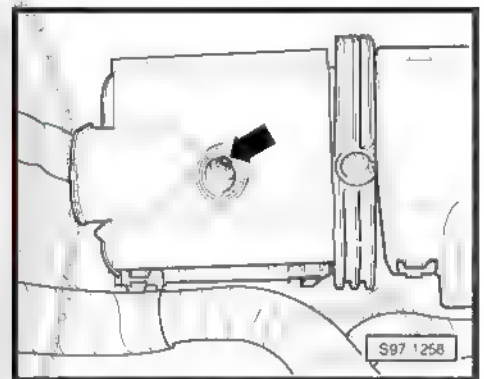
Note

To completely remove the multi-pin connector, it must be removed first from the engine side ➔ [page 171](#) , and then from the cabin side ➔ [page 172](#) .

2.3.1 Removing and installing the multiple connector on the engine side

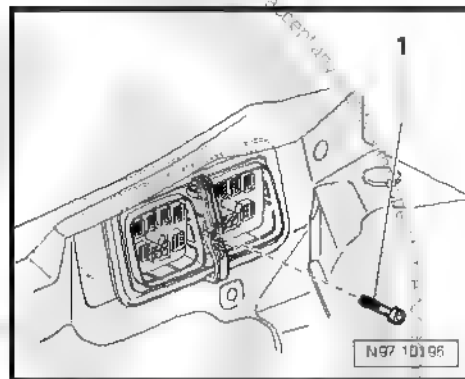
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ➔ [page 1](#) .
- Remove the windscreen wiper mechanism ➔ [page 72](#) .
- Release the fastening screw -arrow- (7 Nm).
- Disconnect connectors.

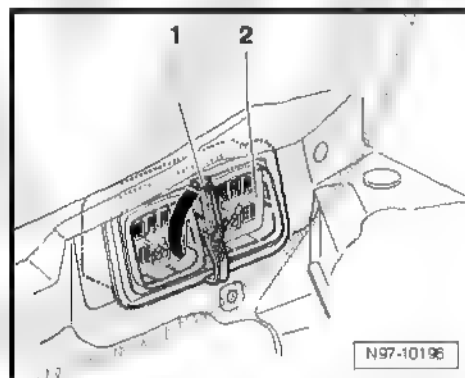




- Loosen the fastening screw -1- (7 Nm).



- Unlock the lock -1- by turning it towards the -arrow-.



Note

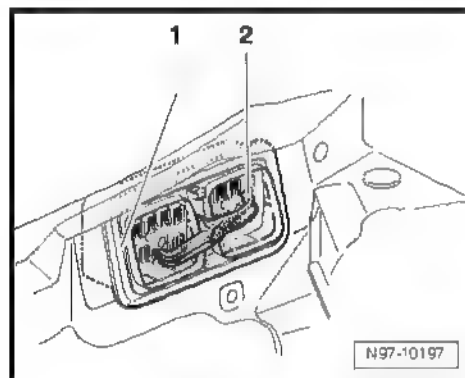
When removing the multi-pin connector -1- completely, the lock -2- must be positioned as shown in the illustration.

- Remove the multi-pin connector by the cabin side
⇒ [page 172](#).

Installation:

Installation is performed in reverse sequence to the removal, considering the following:

- Tighten fastening screws to a torque of (7 Nm).



2.3.2 Removing and installing the multiple connector by the cabin side

Removal:



Note

In order to completely remove the multi-pin connector, it is necessary to remove it by the engine side first.

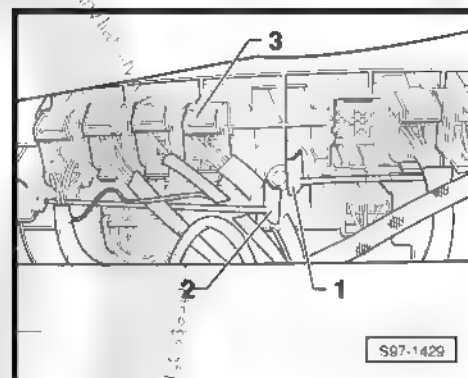
- Remove the multi-pin connector by the engine side
⇒ [page 171](#).
- Remove the instrument panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .



- Pull the central lock -1- to the left and -2- to the right.
- The respective connectors can be unlocked and removed by tightening the upper locking -3-.

Installation

Installation is performed in reverse sequence to the removal





3 Fuse box



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery -> [page 1](#).



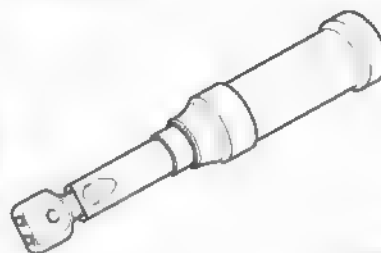
Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery - A- earth wire
- ◆ Safe working conditions for repairing the electrical system are created by disconnecting the earth wire from the Battery - A- (interrupting the current)
- ◆ Upon reconnecting the Battery - A- , check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the Workshop Manual and/or instructions for use

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

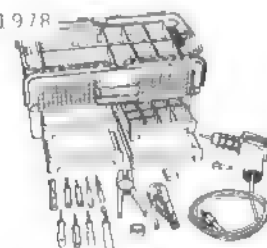
V.A.G 1783



Q00-10085

- ◆ Harness repair set - VAS 1978-

VAS 1978



W00-0447

3.1 Fuse box - remove and install



Note

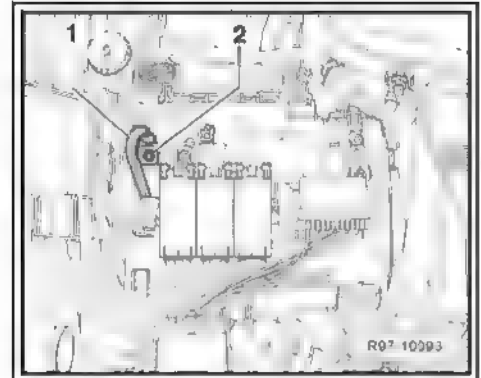
The fuse box is located over the Battery - A- in the engine compartment.



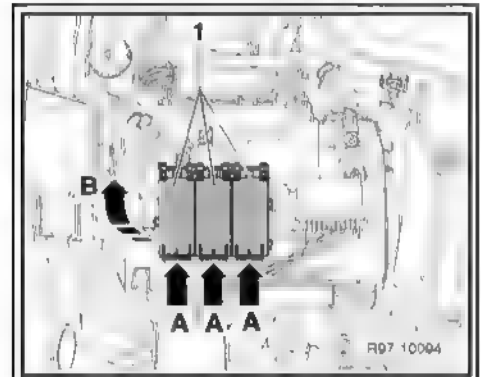
3.1.1 Removal

Turn the ignition and all electric consumers off, and remove the key from ignition.

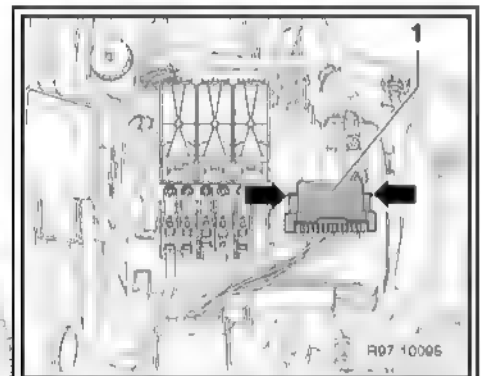
- Disconnect the Battery - A- ➤ [page 1](#) .
- Loosen the fastening nut -2- (6 Nm) and remove cable (B+) -1-.



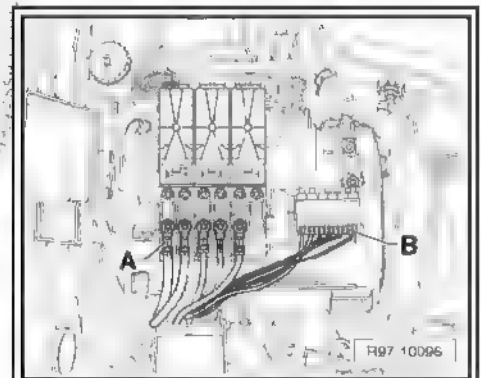
- Unlock -arrows A- the fuse covers -1- and lift them towards - arrow B-.



- Release the fastening locks -arrows- and remove the cover -1-.

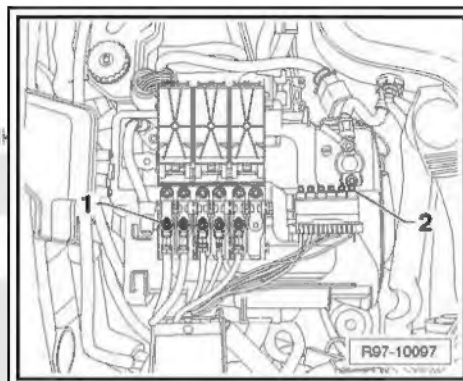


- Identify the pinout of cable terminals -A- with cable terminals-B-.

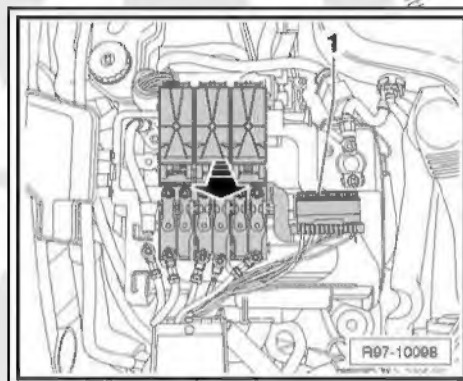




- Remove the fastening nuts -1- and remove the fuses -2-.



- Unlock the fuse holder -1- by moving it towards the -arrow-.
- Remove the cable contacts with the tool indicated in the Harness repair set - VAS 1978-
- Remove the fuse box.



3.1.2 Installation

Installation is performed in reverse sequence to the removal, considering the following:

- Ensure the correct pinout and mounting of all cables to be connected.
- Mount fuses according to the electric diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



4 Control units



WARNING

Before working on the electrical system, it is necessary to disconnect the earth strap from the battery ➔ [page 1](#).



Note

- ◆ *Check whether the vehicle has a coded radio. If so, obtain the anti-theft code prior to disconnecting the ground cable from the Battery - A-.*
- ◆ *Safe working conditions for repairing the electrical system are created by disconnecting the ground cable from the Battery - A- (interrupting the current).*
- ◆ *Upon reconnecting the Battery - A-, check the vehicle equipment (radio, clock, power locks and windows, etc.) according to the repair manual and/or instructions for use.*

4.1 Control unit for the on-board electrical system - J519-

The Control unit for the on-board electrical system - J519- is located behind the dashboard, under the relay carrier.

General description:

The Control unit for the on-board electrical system - J519- has the following functions:

- ◆ Management of the electric load
- ◆ Command of internal lighting
- ◆ Command of the pre-supply fuel pump
- ◆ Command of windscreen washer and wiper, timer drive, and rain sensor
- ◆ Heating of exterior mirror, and rear window
- ◆ Seat heating control
- ◆ Command of flashing and warning light
- ◆ Horn command
- ◆ Speed programmer (transforms signals for the CAN-Bus data network)
- ◆ Remote unlocking of rear lid
- ◆ Dashboard and Combined instrument - K- lighting
- ◆ Electric window drive data
- ◆ Diagnosis interface for the data bus - J533-

Locating defects and indicating faults:

The Control unit for the on-board electrical system - J519- is equipped with a self-diagnosis function.

For troubleshooting, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment.



- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment ⇒ General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .

4.1.1 Control unit for the on-board electrical system - J519- - remove and install

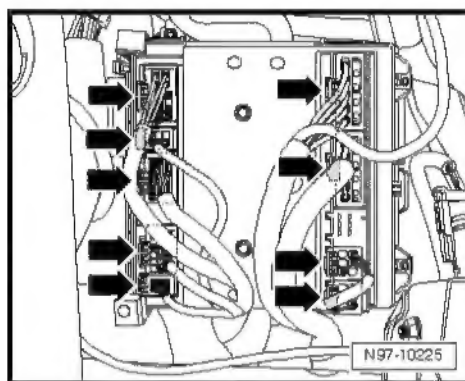
Removal:

- Turn off the ignition, all the electrical devices, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ [page 1](#) .
- Disconnect the connectors -arrows- for the Control unit for the on-board electrical system - J519- .



Note

All connectors fit in one position only, so that it is not necessary to mark their positions.



- Tighten the lock -2- slightly upward and remove the Control unit for the on-board electrical system - J519- downward.

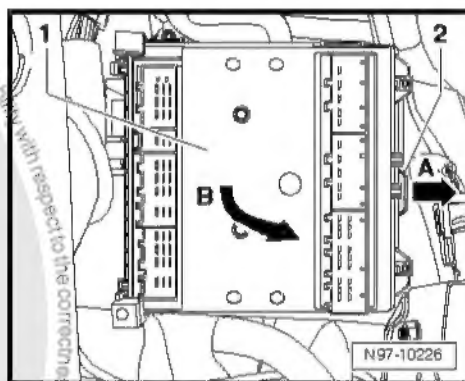
Installation:

Installation is performed in reverse sequence to the removal, considering the following:



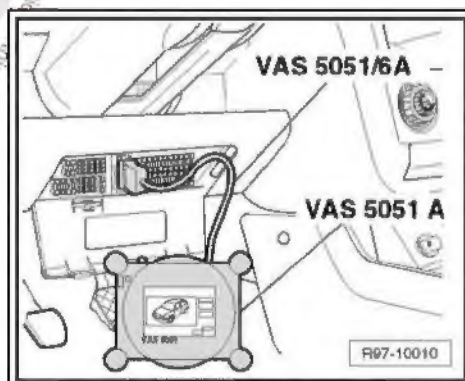
Note

After installing the Control unit for the on-board electrical system - J519- it is necessary to perform its coding ⇒ [page 178](#) .



4.1.2 Control unit for the on-board electrical system - J519- - replace

- Connect the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment ⇒ General Information; Rep. gr. 97 ; Electrical harnesses and cables on the 16-pin diagnosis connector - T16- .
- Turn on the ignition.
- Turn off all electrical devices.
- Proceed by selecting the desired functions ⇒ Vehicle diagnostic tester.



4.2 Central control unit for the convenience system - J393-

The Central control unit for the convenience system - J393- is located beneath the dashboard, at the driver's side, above the



accelerator pedal (in vehicles with right steering wheel, above the clutch pedal).

General description:

The Central control unit for the convenience system - J393- is in charge of the main vehicle functions:

- ◆ Power window drive control
- ◆ Power window drive convenience control
- ◆ Vehicle self-locking control at 15 km/h
- ◆ Self-unlocking control when removing key from ignition
- ◆ Specific adjusting control in function of the country for the alarm system
- ◆ Radiofrequency receiver of remote command
- ◆ Sound signal control when locking and unlocking the vehicle
- ◆ Light signal control when locking and unlocking the vehicle
- ◆ Internal cabin lighting control
- ◆ Internal cabin pressure relief control

When the Central control unit for the convenience system - J393- is damaged or defective, replace it ⇒ General body repairs, exterior; Rep. gr. 57 ; Front doors/ components/ central lock .



Note

- ◆ *After installing the new Central control unit for convenience system - J393- , it is necessary to perform its coding and the remote control adaptation.*
- ◆ *For codification and adaptation, use the Diagnosis, Measurement and Information System - VAS 5051- or Diagnosis, Measurement and Information System - VAS 5052- or later equipment ⇒ General Information; Rep. gr. 97 ; Electrical harnesses and cables .*

02.12

